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Computer simulation model of soil water movement and uptake by plant roots

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Computer simulation model of soil water movement and uptake by plant roots

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ABSTRACT

A computer simulation model is presented of soil water movement and uptake by plant roots including the computer software package which implements the model. The flow of soil water is assumed to satisfy Darcy's law and is modeled with a nonlinear parabolic partial differential equation. Soil-water uptake by the root system is accounted for in the model by a volumetric sink term. The numerical implementation of the model uses one dimensional linear elements and an implicit time step. The model is designed to be sufficiently versatile that it can be applied to a wide range of soils and function with available daily meteorological data.

Efficient and reliable computer software is a prerequisite to implementing an understanding of soil physical processes into operational prediction schemes. Another requirement is more routine methods of specifying soil water characteristics. The bulletin is designed to provide the technical documentation of a computer software package that was developed with a view to contributing in these two areas. It provides the necessary technical material so that the mathematical formulation, the numerical techniques and the computer implementation can be assessed.

RESUME

Les auteurs présentent un modèle de simulation mécanographique du transport de l'eau dans le sol et de son absorption par les racines des plantes, ainsi que l'ensemble de programmes qui appliquent le modèle. La migration de l'eau est censée satisfaire la loi de Darcy et est modèlisée par une équation différentielle partielle, parabolique et non linéaire. L'absorption de l'eau du sol par le système racinaire est prise en compte dans le modèle par une variable de puits volumétrique. L'application numérique du modèle fait appel à des éléments linéaires unidimensionels et à une technique implicite par avancement de temps. Le modèle est conçu de façon suffisamment souple pour pouvoir s'appliquer à une grande diversité de sols et fonctionner à même les données météorologiques quotidiennes disponibles.

L'utilisation d'un logiciel efficace et fiable est la condition préalable à la compréhension des processus physiques du sol et à leur application dans des plans prévisionnels d'exploitation. Une autre condition consiste à utiliser des méthodes plus courantes de détermination des caractéristiques de l'eau du sol. Le bulletin a pour objet de fournir la fiche technique d'un ensemble de programmes élaborés en vue d'enrichir nos connaissances dans ces deux domaines. Il fournit le matériel technique nécessaire pour évaluer la formulation mathématique, les techniques numériques et la mise en forme mécanographique.

INTRODUCTION

Mathematical models can provide a useful synthesis of soil science, plant science and agrometeorology (Philip, 1969; Hillel, 1971). Empirical statistical approaches are often best for prediction for the average situation, but models which simulate processes can provide better insight into one year out of ten occurrences where there would not be adequate data for a valid statistical prediction. In addition, the largest benefit from mathematical modeling generally results from the analysis of abnormal situations. It is felt that this fact provides further justification for incorporating relevant physical and biological theory in models.

In order to solve many of the existing soil water simulation models, detailed soil, crop and climatic data are required (see eg. Nimah and Hanks, 1973, Feddes et al., 1974; van Bavel and Ahmed, 1976; van der Ploeg et al., 1978). Consequently the models have generally been site specific and this has limited their widespread use.

The objective of the present work is to describe a computer simulation model of soil water movement and water uptake by plant roots. The model is designed to be sufficiently versatile that it can be applied to a wide range of soils and function with available meteorological data. Simulations and predictions of the soil water regime in the rooting zone and actual transpiration for a growing crop can be carried out. Since the ratio of actual to potential transpiration can be related to the growth rate of a crop (Hanks, 1974), the model can be considered as a tool for the study of soil water effects on yield.

The flow of soil water is assumed to satisfy Darcy's law and is modeled with a one-dimensional non-linear parabolic partial differential equation. Soil water uptake by the root system is accounted for in the model by a volumetric sink term (Feddes et al., 1974). The surface boundary condition is determined from daily precipitation, potential evapotranspiration and a specification of crop cover. The basal boundary condition can be specified either as a flux or a soil water concentration. The option of specifying a water table is also incorporated.

The computer program is written with the objective of providing efficient and stable numerical algorithms that make it feasible to carry out numerical simulations for the entire growing season. Crop information relating to ground cover and root distribution can be specified as a function of crop development stages. Standardized functions are used for soil water relationships (Clapp and Hornberger, 1978), and up to four distinct soil layers can be simulated. Only minimal changes are required to simulate different soil types.

In the following, the FORTRAN computer program is described, including details required to set it up and run it. The main computer program and subroutines are discussed in sufficient detail so that it should be clear where changes are required to adapt it to a range of possible simulation problems. It is assumed that the implementation

of a diffusion-based soil water simulation model would require a knowledge of soil physics sufficient for understanding the implications of specifying soil physical properties and adequate knowledge of numerical approximations to effectively deal with the problems associated with spatial and temporal grid refinements. This computer program documentation is oriented primarily to someone with this level of expertise. In addition to the software description, the reference material essential to an understanding of the simulation is included in appendices. The first appendix deals with the mathematical formulation, the second appendix deals with the numerical methods used and the third provides a listing of the computer program with a sample run.

Every computer simulation incorporates simplifying assumptions. Complex physical and biological processes must often be lumped into one simple empirical equation as for example is done here with root water uptake (Hayhoe, 1981). The mathematical complexity involved in describing water flow in a layered soil necessitates numerical approximations to the mathematical solutions (Hayhoe, 1978a; Hayhoe, 1978b). For testing and future development it is important to document the details of the simplifications and assumptions that constitute a simulation model. The computer software presented here contains a unique set of simplifications and assumptions which it is felt merit wider application and further development. This technical bulletin is viewed as a necessary component in achieving this.

COMPUTER PROGRAM DESCRIPTION

The simulation model for soil water movement and uptake by plant roots is written in FORTRAN IV using single precision arithmetic. It consists of a main program and ten subroutines. The computer program is written to be sufficiently versatile that it can simulate a range of realistic crop and soil conditions using inputs which one could anticipate being available. The input requirements include soil description, crop characteristics, weather data and computer program controls including spatial and temporal grid refinements. A soil water suction head function and a hydraulic conductivity function must be specified for each soil layer up to a maximum of four. This can be done by selecting functions presented by Clapp and Hornberger (1978) based on texture and clay content or by specifying an alternative set of functions and parameters which more appropriately represent a specific soil. Crop characteristics are input for each crop stage. Crop percentage ground cover and root dry matter distribution are required. Daily precipitation and potential evapotranspiration must be specified. Considerable flexibility has been built in to facilitate a range of formats in weather data specification. The output is designed to meet the requirements of a soil physicist or an agronomist. A detailed output is provided on a daily basis and summaries may be output at each iterations as specified by program control. The output includes a specification of the total water in the profile, the soil water distribution, the plant available water in each layer and the

estimated suction head, conductivity and diffusivity throughout the profile. In addition, the daily and cumulative actual evapotranspiration, actual transpiration, and infiltration of precipitation are output. The daily flux of water through the bottom of the profile is output.

In the following, the main program and the ten subroutines are described in sufficient detail to facilitate the set up and running of the simulation model as well as its adaptation and further development. The equations specified in Appendices A and B are referenced throughout by number.

Main Program

The main program and the subroutines read the input data on logical unit 5. First, the parameters, N, NSTAGE, MD, NLAYR and DTI are read (Format 4I5, F5.1) where:

N is the number of grid-subintervals in the profile;

NSTAGE is the number of defined crop stages;

MD is the total number of days to be simulated;

NLAYR is the number of distinct soils in the profile; and

DTI is the specified time step.

Following this ISTAGE(I) is read (Format 5I5) where ISTAGE(I) is the length in days of the Ith crop stage. Four control parameters are then read, NOUT, JWAT, IC2, and IC3 (Format 4I5) where:

NOUT controls the number of soil water summaries output per day;

JWAT indicates whether a water table depth is specified - if JWAT is greater than zero, water table depths are read;

IC2 controls an adjustment for water balance - if IC2 is greater than zero, no adjustment is made; and

IC3 indicates the bottom boundary condition - if IC3 equals zero, then the content is specified and the flux calculated and if IC3 equals 1 then the flux is specified and the content is calculated.

Next the thickness of grid-subintervals in cm, R(I), is read with Format (16F5.2). Following this a card is read for each soil layer with Format (I2, 6F6.2, I2) where:

ITP is a parameter used to control the selection or entry of the coefficients for the Clapp and Hornberger equations or for user specified functions;

FC is the water content at field capacity in cm^3/cm^3

PWP is the water content at the permanent wilting point in cm^3/cm^3

WI corresponds to θ_i in eq. (4);

DPTH is the thickness of the layer in cm;

WK corresponds to θ_k in eq. (7) and

NLAY is the index of the node at the top of the layer described.

This information is used as input in the subroutine PARM, which is now called.

In order to provide for an examination of the functions resulting from the specification in PARM the suction head, conductivity and diffusivity are calculated using FUNL and output at selected moisture contents for each layer specification. Following this the node depths are calculated and output on logical output unit 7.

Throughout the main program CO7 denotes air dry volumetric soil water content. This is set equal to 0.04 cm^3/cm^3. This value could vary from soil to soil and in addition one might want to make it a function of environmental conditions. The two Gaussian weighting factors, GP, are set for future numerical integrations.

The computer program is written with the objective of being able to simulate soil water conditions for a growing crop. For this reason the DO loops over time are nested in such a way as to facilitate reading the appropriate crop parameters and weather variables. The first loop is over crop stages where new crop and root parameters are set. The next loop inside the crop stage loop is over days. Here daily weather data and daily soil water flux are initialized and evaluated. Within the daily loop is a final loop over specified time steps required for the numerical solution of the differential equation. Within this loop period values for the potential evaporation and precipitation are determined in the subroutine PETFIT and the matrix equations specified in eq. (15) and (16) are set up and solved for a new soil water distribution.

In order to point out some of the special features, more detailed aspects of the program will be discussed. Before any time loops are initiated the initial volumetric soil water content in cm^3/cm^3 is read (Format 13F5.3) and also printed out on logical output unit 7. In addition, the global mass matrix, which is matrix B in eq. (15) is set up. Note that since the matrices A and B in eq. (15) are symmetrical and tridiagonal only the diagonal and upper diagonal elements are calculated and stored.

At the beginning of each daily increment loop variables are initialized as required. Note that in this version of the program sunrise in hours, denoted by SUNR, is set equal to 6 and sunset, denoted by SUNS, is set equal to 18. For some simulations it would be more appropriate to either read or calculate and store actual values in the subroutine METDAT for specification here and use in the subroutine PETFIT. In addition, the start and termination of daily precipitation in hours are denoted with WST and WEND respectively. Here WST is set equal to zero and WEND equal to 24. Again if more detailed information were available, it could be used.

A feature has been added to increase or decrease the size of the time step, DT, based on near surface soil conditions and weather variables. If less than 0.5 cm of rain occurs and the average water content at the top three nodes, CNM, is less than or equal field capacity then the time step is doubled. If more than 0.5 cm of rain occurs and CNM is less than field capacity or less than the permanent wilting point the time step is cut by one half or one quarter respectively. This adjusted time step, denoted by DT, is used for the one day. Given DT the number of time steps for the day, denote by MP, is determined.

With each time step eq. (15) is set up and solved and then eq. (16) is set up and solved. This is controlled by the index KPC. In this version of the program only one corrector step is made but additional iterations through eq. (16) are possible by increasing the limit on KPC. In addition, it is possible to eliminate the corrector step by reducing the limit on KPC required for branching out of the loop. In all cases the program sets up the matrix A and S using DP as the argument, in eq. (15) or (16). Then eq. (15) or (16) are assembled and solved for the new water content at time J+1, CS, using tridiagonal Gaussian elimination. The subroutine BCON is then called to estimate the water content, CS(1), at the surface. At the bottom boundary for the prediction step the water content is set equal to DP(N+1) where DP is the water content at time $J+\frac{1}{2}$. Alternatively, if the zero gradient is assumed, CS(N+1) can be set equal to CS(N). After the water content, CS, has been estimated for all N-1 nodes, the values are checked and forced to lie between saturation and air dry. The index KPC is checked. If the corrector steps are complete or not required then the time step is completed and KPC is initialized to zero. Otherwise, the new estimate for DP is set and KPC is incremented by one. Then a new estimate for the water content, CS, is made using eq. (16). To complete the calculations associated with each time step CN, the water content at new value of J, is set equal to CS and a new DP is estimated. The surface actual evaporation, SAE, surface water infiltration, SWIN, and the total actual evapotranspiration, including root water uptake, TRU, for the period are added to form the corresponding daily totals, TSAE, TSWIN and RAE. The control parameter IC3 is checked. If IC3 equals 1, CN(N+1) is set equal to the previously specified water content, BBC, and the flux through the bottom, FLBP, is estimated based on the gradient relationship. If IC3 equals 2, then the flux FLB is set equal to the specified BBC and the content, CN(N+1), is estimated based on the predicted flux. The accumulated flux for the period, FLBP and the total for the day TFLB are also calculated. At the end of the time step the water in the profile is calculated. An option, whose use is controlled by IC2 can be used to check the change in water content and force it to match the flux through the upper surface. Finally, an accumulation is made of surface flux for the total simulation period and a check is made for output of the soil water information for the period. When the period iterations for the day are complete then a daily summary is output on logical output unit 7.

SUBROUTINE PARM

This subroutine is called once to establish the parameters for eq. (4) through eq. (9). Since the program is designed for up to four distinct soil layers, there is a loop in the routine which generates these coefficients for each distinct layer and stores them in the two-dimensional array denoted by CO. The notation for the coefficients for each layer are as follows: CO_1 denotes b in eq. (4), CO_2 denotes ψ_s in eq. (4), CO_3 denotes θ_s in eq. (5), CO_4 equals K_s in eq. (8), CO_5 denotes c in eq. (6), CO_6 denotes d in eq. (6) and CO_6 denotes K_f in eq. (8). If a different function specification for $\psi(\theta)$ and $K(\theta)$ is used then up to eight coefficients can be read and stored in CO for each distinct layer. In addition, WI denotes θ_i in eq. (6) and WKI denotes θ_k in eq. (7). Calculated values for the coefficients from Clapp and Hornberger (1978) are stored in the routine and may be selected by specifying the control, ITYPE. Alternatively, if ITYPE equals 12, CO_1, CO_2, CO_3, CO_4 are read (Format 4F9.6).

The objective in this routine was to use available information in the specification of soil water characteristics. Therefore, if plant available water in the Ith layer PAW(I), is specified greater than zero, CO_2 in eq. (4) is adjusted to fit. If the permanent wilting point in the Ith layer, PWP(I) and field capacity, FC(I), are specified greater than zero, then CO_1 and CO_2 in eq. (4) are adjusted to fit through these points. Note that the suction at field capacity, SFC, and at the permanent wilting point, SPWP, are specified as 15000 and 344 cm of water respectively. Both SFC and SPWP can be adjusted to better fit a particular soil. In addition, where required, the coefficient CO_7 is calculated as specified in eq. (7) and eq. (8). There the conductivity at field capacity, FCK is specified as 10^{-5} cm min^{-1}.

Finally this subroutine calculates as required and prints on logical unit 7, the layer thickness, available water, field capacity and permanent wilting point for each layer based on the Clapp and Hornberger (1978) equations. In addition, the coefficients for eq. (4) through eq. (9) for each layer are printed on logical unit 7.

SUBROUTINE WTABLE

This subroutine reads the water table depth in cm, DTABLE(I), for each day of the simulation. Given the water table depth on day I, the program determines the index of the first node lying within the water table and stores the result in DTABLE(I). This subroutine is called once. If the control parameter, JWAT, is less than or equal to zero, no water table is assumed and the subroutine is bypassed.

SUBROUTINE METDAT

This subroutine is called once and its function is to input the meteorological data. The present version is structured with the view that the basic meteorological parameters could be specified in various formats from a number of sources. A control parameter IMET is defined and used in a GO TO statement so that routines can be incorporated to read data and calculate the required potential evapotranspiration. The present version simply reads on logical unit 5, the potential evapotranspiration, PEVAP(I), and precipitation, PRECIP(I), for day I with format (2F5.2).

SUBROUTINE ROOTDN

This subroutine is called at the beginning of each specified crop stage and its function is to generate the root density, RDF(I), in gm cm^{-3} for the Ith Gauss point. The location of the Ith Gauss point is denoted by THG(I), and is calculated in the routine using the grid subinterval width, R(I), and the weighting factor, GP(I). The control parameter, IROOT, the fraction ground cover, COVER, and a root effectiveness parameter, ROOTEF, are read (Format I3, 2F4.2). IROOT, is used in a GO TO statement to select the type of specification of the root. If IROOT equals 1, the coefficients are read and the distribution generated with an exponential function (Feddes et al., 1974). If IROOT equals 2, the root density and depth are read with (Format 2F10.2) and the subroutine INTERP is called to generate the root densities at the Gauss points. The results are output on logical output unit 7.

SUBROUTINE PETFIT

This subroutine is called at each time step and its function is to determine the potential surface flux, PET, in cm min^{-1} for time interval J1. PET is positive for evaporation and negative for precipitation. The daily potential evaporation, PE, is distributed between sunrise, SUNR, and sunset, SUNS, specified in hours using a sine curve. The rainfall, W, in cm is distributed uniformly from the start, WST hours, and the end, WEND of the precipitation. Daily precipitation is distributed uniformly throughout the day. The precipitation for period, J1 is then subtracted from the potential evaporation to produce PET.

SUBROUTINE ROOTUP

This subroutine is called at each iteration where both PET and the fraction ground cover are greater than zero. It calculates the root uptake using the model specified in eq. (3) and described in detail in the section on mathematical methods. The root suction, ψ_r, is denoted by RP and set to 15000 cm water. Referring to eq. (3), c_r is denoted in the subroutine by ROOTEF, HKA(I1) denotes the Ith Gauss point value of $K(\theta)$; HWA(I1) denotes the Gauss point value of $\psi(\theta)$; RDF(I1) denotes the Gauss point value of W(x); and ZAE(I1) denotes the Gauss point value of R. Note that ZAE is always set greater than or equal to zero and is set equal to zero when HWA is less than 50 cm water to account for the fact that roots generally do not take up water when oxygen becomes limiting. The potential transpiration, X, is determined by multiplying

PET by COVER. The root uptake, UT, is accumulated until it equals X. On the corrector step of the predictor corrector routine, the root water uptake in cm for the profile in time DT, UT3, and the cumulative root water uptake, TRU, are set.

SUBROUTINE FUNL

This subroutine is called once for each iteration. Its function is to estimate the hydraulic conductivity, HKA, the soil water suction, HWA, and the soil water diffusivity DIA at each Gauss point using the Clapp and Hornberger functions parameterized in PARM. In addition, it is indicated in the routine where and how one could specify alternate functions.

The subroutine is structured to admit a layered soil. The program loops over the number of layers, NLAYR. Firstly it sets the coefficients and parameters for the layer and then sets the limits, NMIN and NMAX, for a loop over the Gauss points within in the layer. The assumption is made that the soil water parameters change is continuous over the interface layer. Therefore, the function evaluations at the first Gauss point in the new layer are based on the layer above while at the second Gauss point on the new layer. This is controlled by the index JMIN.

SUBROUTINE DISCON

This subroutine is called once for each iteration if the soil is layered. Its function is to add a correction term to the numerical approximation to eq. (1) at the soil interface to account for the change in soil water suction due to a change in soil. This adjustment is required because ψ is a function of θ and x rather than θ alone across the interface layer. The derivative of ψ with respect to x, at a fixed time t, across the interface layer must include the derivative of ψ with respect to x, denoted by DERIV, for a fixed water content, denoted by XAV, as well as the usual derivative of ψ with respect to θ which is incorporated in the diffusivity term in eq. (1). The derivative of ψ with respect to x, DERIV, is evaluated across the interface layer by assuming linear interpolation between the two layers.

SUBROUTINE BCON

This subroutine is called at each iteration. Its function is to use the potential flux of water, which is denoted by PET, to calculate both the new water concentration at the surface node and the actual soil water flux at the surface. If evapotranspiration can occur, the index for crop ground cover, COVER, is used to partition evaporation from the soil surface and transpiration from the crop canopy.

Two approaches to estimating the surface boundary conditions have been incorporated and they are selected using the control parameters, ISURF. If ISURF equals 0 then the equation for water transfer in the surface layer is used directly. The concentration at the surface node, CS(1), which would be required to give the gradient to produce the potential flux is estimated first. Note that HI denotes a weighted average hydraulic conductivity and DI denotes a weighted average

diffusivity for the surface layer. The weighting is set to best simulate evaporation or infiltration conditions. If the resulting value for CS(1) does not lie between air dry, CO_7, and saturation, CO_3 then CS(1) is set to the appropriate value and flux is estimated based on the resulting gradient in water content.

If ISURF is greater than zero the value of CS(1) is smoothed by assuming it is equal to the average water content in the top half of the surface layer. The amount of water in the upper half layer is budgeted based on flux through the surface and flux of water across the mid-point of the layer.

SUBROUTINE INTERP

The subroutine is called by ROOTDN if observed root densities are used. In addition, it has potential usefulness for interpolating between observations of a range of input information. The observed dependent and independent variables are denoted within the subroutine by Y and X respectively. N denotes the number of observation points and M denotes the number of points to be interpolated. Note that the routine uses linear interpolation between observed values. The interpolated dependent and independent values are denoted by CINTRP and XINTRP respectively.

RESULTS AND DISCUSSION

In this section a typical test run of the modelling program is presented. It is assumed that to use this computer program, one would start with this test case and then modify it to meet special requirements. It consists of a 20-day simulation with a layered soil. The top 30 cm is assumed to be a sandy clay loam and the remaining 90 cm is clay. The initial soil water content is set equal to field capacity. The potential evapotranspiration is assumed equal to 0.7 cm throughout. On day 11 of the simulation, 3.0 cm of precipitation is added to the profile. The crop is assumed to go through two 10-day development stages during the simulation. The details of setting up this computer run are delineated in the following.

The simulation was run on a VAX mini-computer which is part of Agriculture Canada's AGRONET system. The input used for the sample run is presented in the appendix. The first statement read from the input file sets N equal 18, NSTAGE equal 2, MD equal 20, NLAYR equal 2 and DT1 equal 60. The next statement specifies the two crop stages, ISTAGE(I), equal 10 days each. The third statement sets NOUT equal 3, JWAT equal 0, IC2 equal 0 and IC3 equal 0. The next two statements read give the 18 grid-subinterval widths denoted by R(I). Two statements are then read to specify the soil for each layer. For the top layer ITP equals 6; FC, PWP and PAW are unspecified and threfore set equal 0; WI equals 0.92, DPTH equals 30; WK equals 0.9 and NLAY is equal 1. For the second layer ITP equals 11; FC, PWP and PAW are 0; WI equals 0.92; DPTH equals 90; WK equals 0.9 and NLAY is equal 8. The

next two statements specify the initial values for CN(I). CN is set equal to 0.25 in the top 30 cm and 0.373 in the bottom 90 cm which correspond to field capacity for the respective layers. Rather than reading in the values for precipitation and potential evapotranspiration, they are generated in the subroutine METDAT. The final four statements are read by the subroutine ROOTDN and specify canopy and rooting characteristics for the two crop stages. For the first stage two statements are read which set IROOT equal 1, ROOTEF equal 1, COVER equal 0.5, A equal 5.13 and B equal 0.32. The final two statements in the input file specify for the second crop stage, IROOT equal 1, ROOTEF equal 1, COVER equal 0.9, A equal 5.13 and B equal 0.08. The coefficients A and B for the two crop stages, give rise to root density distributions as plotted in figure 1.

The output generated by the soil water model run with these controls is included in the appendix. The first two output lines are the input statements specifying the soil and layer thickness. The layer characteristics as calculated in the subroutine PARM are then printed, including the coefficients for the soil water functions. In this simulation field capacity is set to 344 cm of water and the permanent wilting point to 15000 cm of water. In addition K_c in eq. (9) is set equal to 10^{-5} cm/min. In order to specify more clearly the resulting soil water functions for each soil layer, their value at ten equally spaced water contents is calculated and output and plotted in figures 5, 6 and 7. The node depths and initial water content at this node are printed.

The root distribution generated in the subroutine ROOTDN assuming an exponential function is printed for the first crop stage. This is followed by detailed results of fluxes, root water uptake and soil water distribution estimation. Since NOUT is set equal to 3, the estimated water content at the nodes is output as well as the water in the profile and the flux through the bottom every eight hours. Note that in this sample model run, zero water content gradient is assumed across the lowest grid subinterval. It should be pointed out that since the computer simulation involves a numerical approximation to eq. (1), that inappropriately large spatial or temporal grid refinements can lead to unacceptable errors. In this output hourly time steps were used and the errors resulting from the numerical techniques did not appear unacceptable given the levels of accuracy expected in the input data. For large hydraulic conductivities, used with large time steps, the estimated flux through the bottom can be too large and should be checked against the change in the water in the profile.

At the end of each day a summary of the fluxes and soil water profile is printed. Firstly the estimated average water content and the percent plant available water are printed for each soil layer. A summary of daily and cumulative values for potential evapotranspiration (PE) and actual evapotranspiration (AE), transpiration, precipitation and infiltration is printed.

Since crop stage 2 starts on day 11, the new crop root distribution is evaluated and printed. For stage 2, the crop canopy parameter, COVER, is set equal to 0.9. In the flux summary for day 11, the results of the first precipitation are printed. The precipitation is 3 cm and 2.3 cm infiltrated the soil. The difference equals the PE which is subtracted before the water enters the soil. Under these conditions the model leaves the AE and transpiration remain at 0 for the day.

The accumulated volumes of potential evapotranspiration, actual evapotranspiration and its components are shown in figure 2. Although during the first 2 or 3 days of the simulation run the actual evaporation and the actual transpiration were very similar, later on the rate of actual evaporation dropped off quickly to less than 0.1 cm day^{-1}. Even the 3 cm rainfall on day 11 did not substantially increase this rate. Consequently, the rate of actual transpiration approximated the rate of actual evapotranspiration.

During the first 10 days of the simulation period, the rate of actual evapotranspiration decreased slowly (Figure 2) in response to decreasing water availability (Figure 3), especially in the upper layer. However, because of the increased rooting depth and density and the 3 cm of rain on day 11, the rate of actual evapotranspiration followed closely the potential evapotranspiration rate. For example, the model predicted an actual average evapotranspiration rate of 0.65 cm day^{-1} between day 11 and 20, while the potential rate was 0.7 cm day^{-1}.

Some of the soil water content profiles produced by this particular simulation run are shown in figure 4a and b. The discontinuous nature of these profiles is due to the fact that we assumed that the soil water potential and not water content distribution itself, was continuous throughout the profile, across layer interfaces. During the first 10 days the water content in the upper layer decreased rapidly by 7% to an average water content of 0.18 cm^3 cm^{-3}, while that of the lower layer decreased by only 2% to 0.35 cm^3 cm^{-3}. Plant available water dropped correspondingly from 100% to 33% in the upper horizon and to 73% in the lower layer (Fig. 3). During the second half of the simulation run, when the root system had expanded three-fold, the water content of the upper layer decreased to 0.13 cm^3 cm^{-3}, which was below the permanent wilting for the layer, while the water content of the lower layer had decreased to 0.32 cm^3 cm^{-3}, which corresponded to 54% plant available water. The water in the entire profile fell from 37.6 cm on day 10 to 34.1 cm on day 20. However, the ratio of actual to potential transpiration increased from 0.65 to 0.91 during the same time period, which demonstrates the model's sensitivity to changes in the root system.

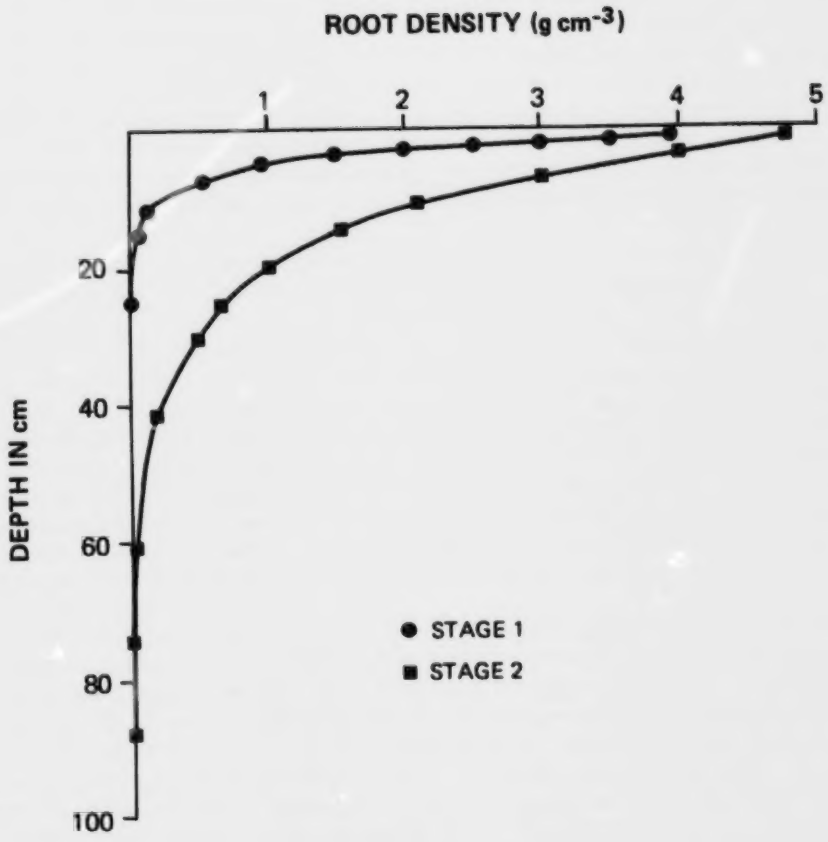


Figure 1: Root density distributions used in the simulation to demonstrated root water uptake

Figure 2: Simulated evaporation and transpiration for 20-day period

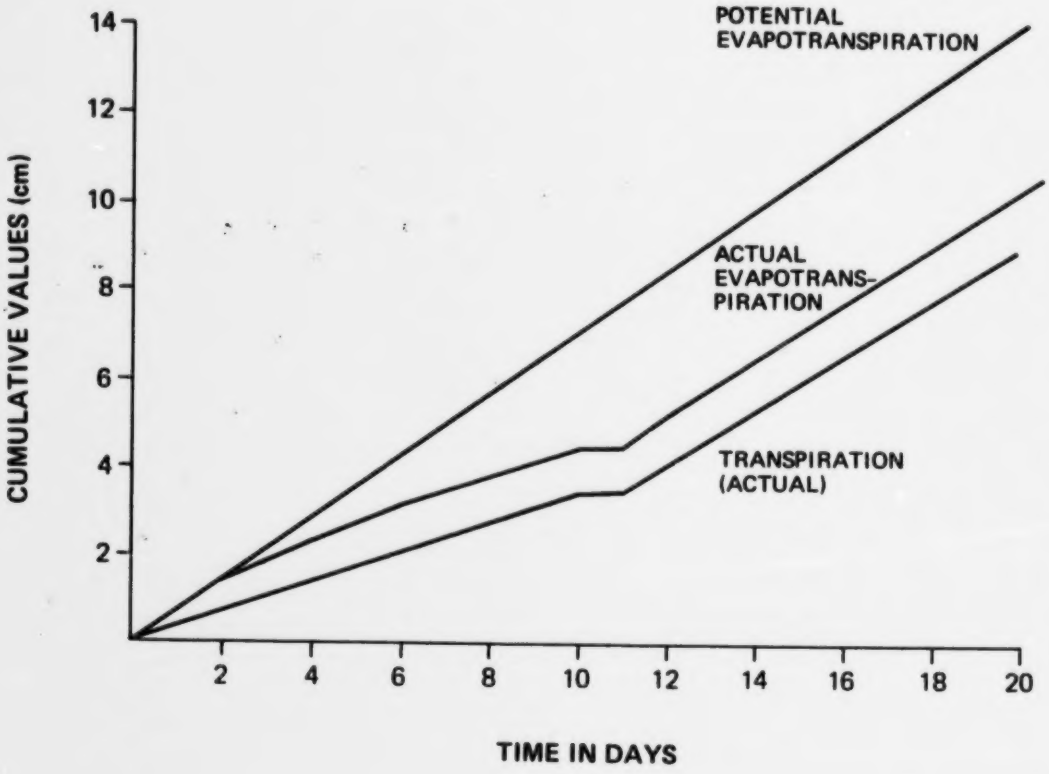
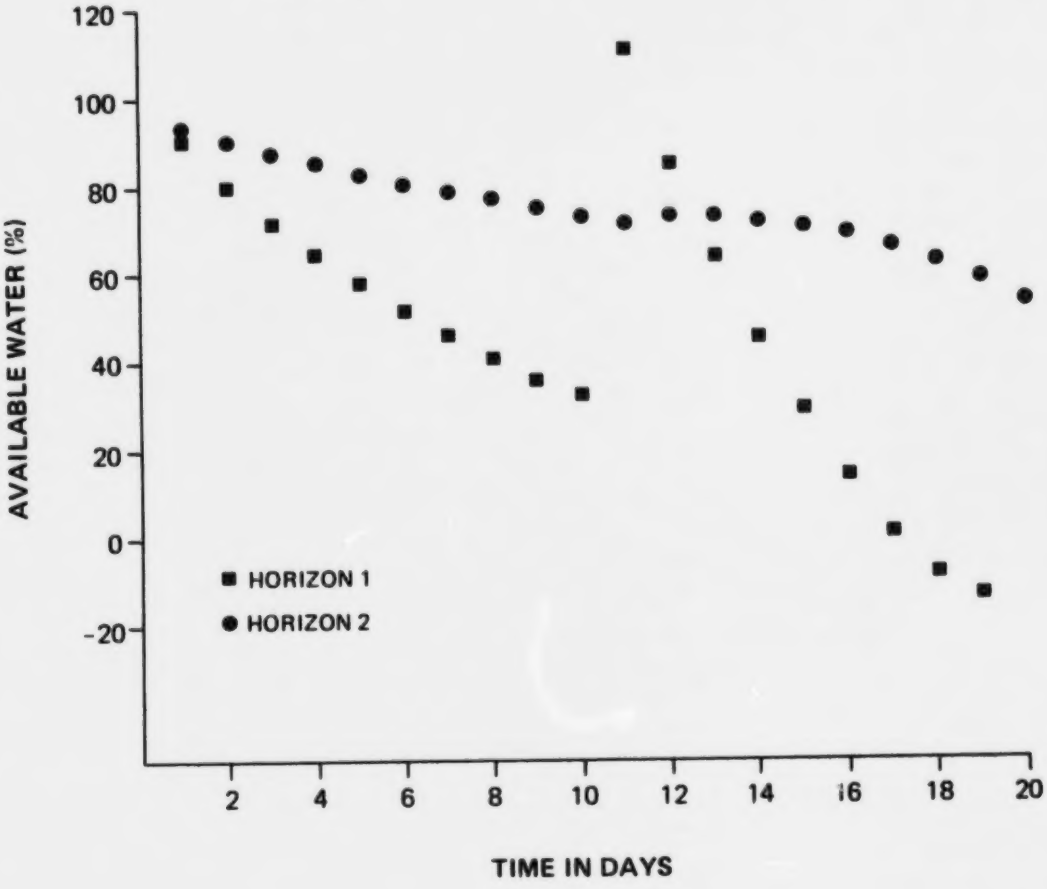


Figure 3: Simulated plant available water over a 20-day period for both the upper and lower soil horizon.



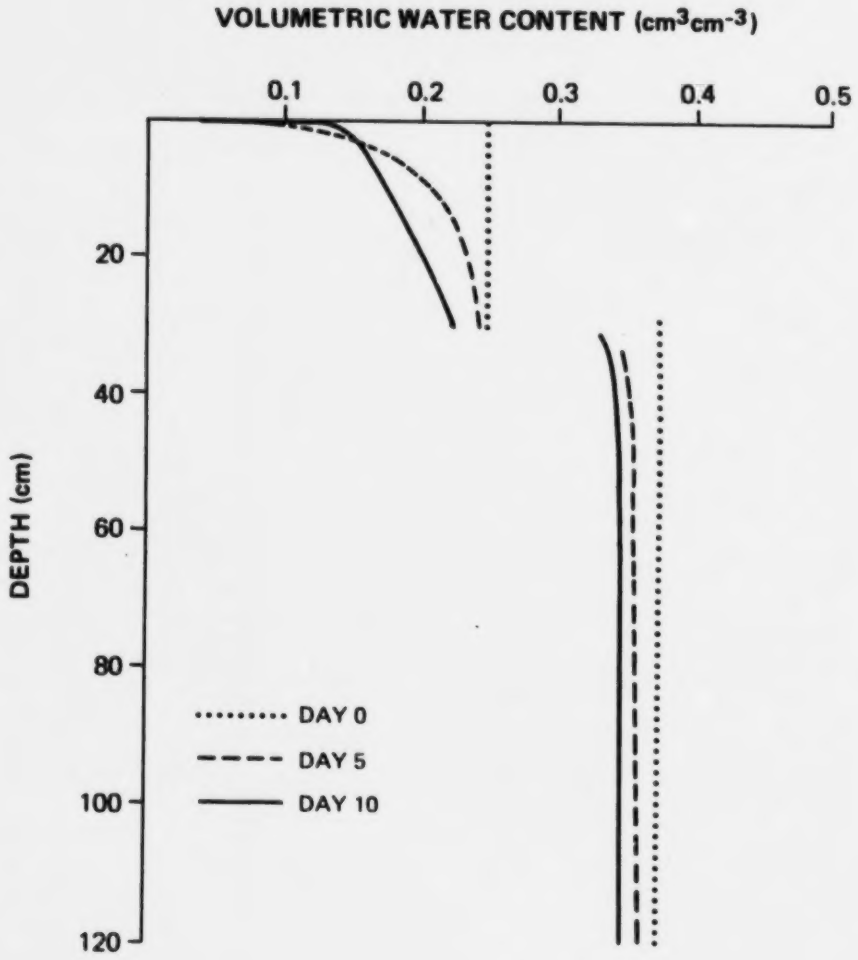


Figure 4a: Simulated soil water content profiles at selected times during the first 10-days

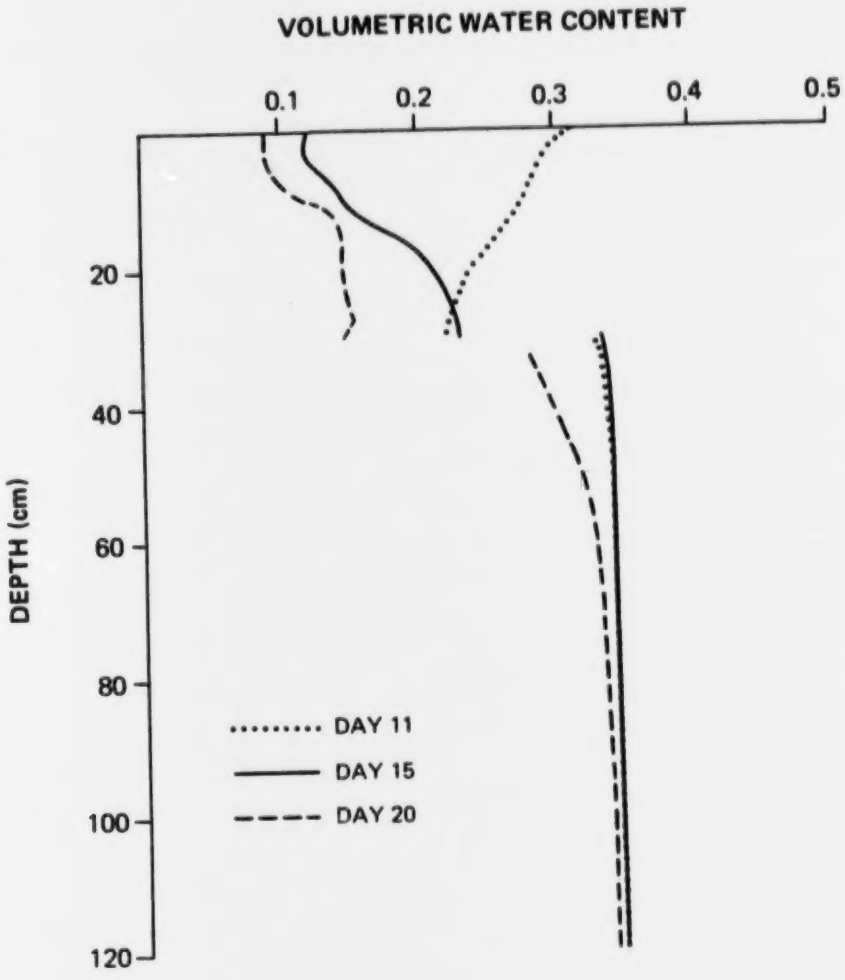


Figure 4b: Simulated soil water content profiles at selected times during the last 10-days

Figure 5: Soil water and suction head relations used in simulation.

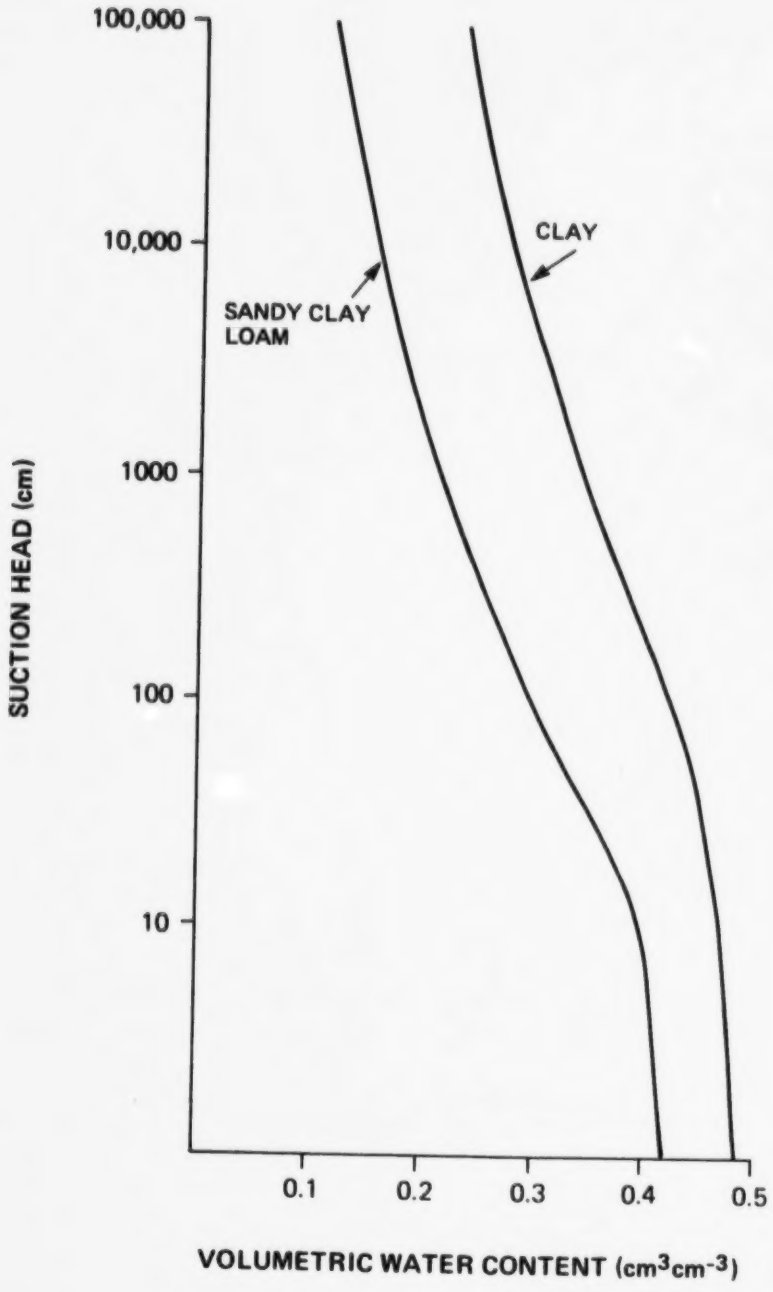


Figure 6: Hydraulic conductivity functions used in simulation

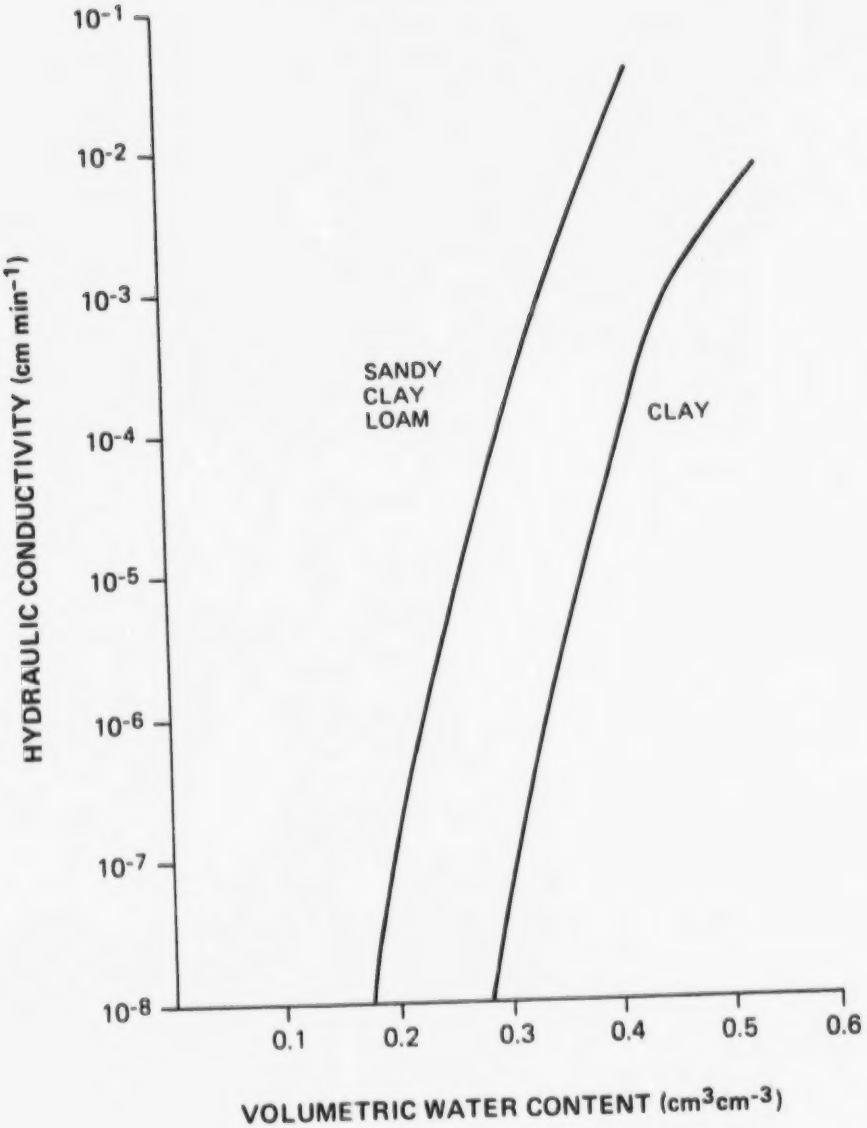
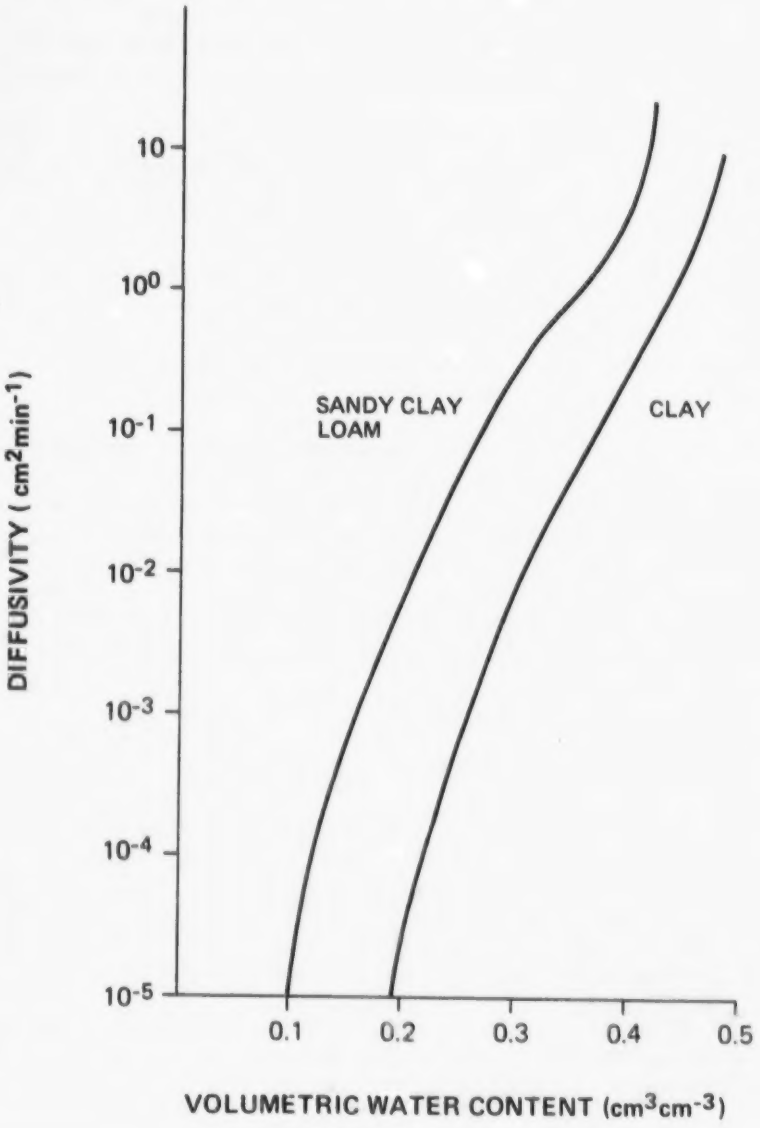


Figure 7: Diffusivity functions used in the simulation



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APPENDIX A

Mathematical Methods

In this section we provide a summary of the mathematical procedures used in the modelling program. The mathematical equations for the movement of soil water and the uptake by plant root systems have been specified as follows:

$$\frac{\partial \theta}{\partial t} = \frac{\partial}{\partial x} \left(D(\theta) \frac{\partial \theta}{\partial x} + K(\theta) \right) + R(\theta, x, t) \tag{1}$$

where
t is time in min, t takes values from 0 to T;
θ is the volumetric water content in cm^3 of water per cm^3 of soil;
x is the vertical distance from the soil surface in cm (positive downward), x takes values from 0 to L;
$\psi(\theta)$ is the soil-water suction head function in cm;
$K(\theta)$ is the hydraulic conductivity of the soil in cm per min;
$D(\theta)$ is the soil-water diffusivity function defined by the equation

$$D(\theta) = \frac{d\psi}{d\theta} K(\theta); \tag{2}$$

$R(\theta, x, t)$ is the water uptake by roots in cm^3 of water per cm^3 of soil per min. To solve eq. (1), $\theta(x,t)$ must be specified for all x at t=0 and for x=0 and x=L for t=0 to T. Meteorological conditions are required to specify $\theta(0, t)$ and L is chosen such that an appropriate value for $\theta(L, t)$ can be determined, either by specifying a concentration or flux condition at x=L. Following Feddes et al. (1974), the root sink term is defined by:

$$R(\theta, x, t) = cK(\theta) \quad (\psi_r - \psi(\theta)) \quad W(x) \tag{3}$$

where
$W(x)$ is the root weight function in gm per cm^3;
ψ_r is the root suction head;
c is a parameter to adjust for root effectiveness.

A major obstacle to successful application of this mathematical model to an actual soil system relates to the problem of appropriately specifying $K(\theta)$, $\psi(\theta)$, and R. A potentially useful approach to this problem has been suggested by Clapp and Hornberger (1978). They propose standardizing $K(\theta)$, and $\psi(\theta)$ so that a change in soil would only require a change of the parameters in the standardized relations. Further, they provide parameters for their functions for a wide range of soil textures and soil clay contents. The problem of specifying $K(\theta)$ and $\psi(\theta)$ now reduces to that of providing the appropriate parameters by selecting them from a table according to textural group (Clapp and Hornberger, 1978) or by deriving them from point observations on $K(\theta)$ and $\psi(\theta)$. Following Clapp and Hornberger (1978),

$$\psi(\theta) = \Psi_s \, (\theta/\theta_s)^{-b} \qquad 0 \leq \theta \leq \theta_s \tag{4}$$

$$K(\theta) = K_s \, (\theta/\theta_s)^{2b+3} \tag{5}$$

where b, θ_s, Ψ_s and K_s are the parameters to be specified. It is assumed that θ_s is the saturated water content and that K_s is the saturated hydraulic conductivity. Since $\psi(\theta_s) = 0$, a value θ_i, is selected near θ_s, and a parabola for $\psi(\theta)$ is fit for θ between θ_i and θ_s such that $\psi(\theta)$ and its derivative are continuous at θ_i. On this interval,

$$\psi(\theta) = c(\theta/\theta_s - d)\ (\theta/\theta_s - 1) \qquad \theta_i < \theta \leq \theta_s \tag{6}$$

where c and d are evaluated according to the conditions just specified.

During the course of this study, it was found that a similar adjustment might be required for $K(\theta)$. For example, if $K(\theta)$ undergoes a very sharp increase near θ_s, as is commonly observed in highly structured media and fine textured soils, selecting K_s equal to the observed saturated hydraulic conductivity would result in values for $K(\theta)$ which are too large for a wide range of intermediate θ values. The adjusted equation for hydraulic conductivity was then specified by:

$$K(\theta) = K_f\ (\theta/\theta_s)^{2b+3} \qquad 0 \leq \theta < \theta_k \tag{7}$$

$$K(\theta) = K_f\ (\theta/\theta_s)^{2b+3} + (K_s - K_f)\ ((\theta-\theta_k)/(\theta_s - \theta_k))^2$$

$$\theta_k < \theta \leq \theta_s$$

where θ_k is an intermediate value for θ for which $K(\theta_k)$ is known or can be estimated. The value of the parameter K_f, is determined from eq. (7) by the relation

$$K_f = K(\theta_k)\ \ (\theta_s/\theta_k)^{2b+3} \tag{9}$$

For this study, θ_k was selected such that $\psi(\theta_k)$ equalled 344 cm H_2O, a value which has been found to approximate field capacity (Colman, 1947; Haise et al., 1955). Field capacity was chosen because by definition it corresponds to a condition of low conductivity for all soils. Data presented by Ahuja (1973) and Bruce and Whisler (1973) suggest that this small value may be between 10^{-5} and 10^{-6} cm min^{-1} for a wide range of soil textures. Hence, in the absence of a measured value for $K(\theta_k)$ it was assumed to be 10^{-5} cm min^{-1}, except under the condition where the resulting K_f was greater than K_s; in that case eq. (5) was used.

It should be pointed out that the estimated values for $\psi(\theta_k)$ and $K(\theta_k)$ are averages. Undoubtedly better estimates can be obtained and substituted when specific soil types and textural groups are considered, and of course measured data should be used whenever they are available.

A major function of the mathematical model for soil water is to predict the actual evapotranspiration. The potential evapotranspiration is the combined evaporation from the soil surface and transpiration from the plant which would occur if water were not limiting. It is determined by meteorological and crop parameters (Feddes et al., 1974). The

partitioning of the potential evaporation between the plant and soil surface is determined by the crop cover similar to the procedure proposed by Nimah and Hanks (1973).

Water is assumed to evaporate from the soil surface at the potential rate when moisture is not limiting which provides a flux surface boundary condition. Under drier conditions the actual evaporation is controlled by the rate of upward water movement to the soil surface. Under such conditions, the upper boundary condition is to set the soil water content to its air dry value. Similarly, for precipitation water enters the soil at a rate equal to the precipitation until the surface becomes saturated. Then the surface is assumed saturated and infiltration is limited by the rate with which water flows through the surface zones.

Transpiration by the plant is controlled by the sink term specified by eq. (3). Feddes et al. (1974) proposed using an iterative technique to evaluate ψ_r such that the plant would transpire at the potential rate until ψ_r reached a maximum of 15000 cm of water. The assumptions specified in their model appear to permit water moving from the plant into the soil. Here, a simpler procedure is proposed. It is assumed that the crop will attempt to meet evaporative demand from the top zone. If this is not possible it will extract water successively through lower zones until the potential transpiration is achieved. If the potential is not achieved then the actual transpiration is the sum of the water extracted from each zone. The model assumes the value of ψ_r in eq. (3) reaches the maximum of 15000 cm of water in each zone. This model specification should not be interpreted to mean that all the plant available water is extracted from the upper zone before any water is extracted from lower zones. Firstly, whenever the actual transpiration is less than the potential, water is extracted from all zones simultaneously as specified by eq. 3. These results would be identical to those predicted by the model presented by Feddes et al. (1974). When water is available both near the surface and deep in the profile, the model assumptions imply that the crop would first use the readily available moisture near the surface. The justification for this assumption is that in the top layer of the soil the temperature, nutrients and aeration are generally most favorable for root activity. As water is depleted, uptake from the surface zones decreases rapidly due to the rapid decrease in $K(\theta)$ in eq. (3). The result is again a more uniform extraction pattern of soil water by the crop roots.

APPENDIX B

Numerical Methods

Eq. (1) is solved numerically using linear piecewise elements and the Galerkin technique as described by Hayhoe (1978). The space variable is discretized by using linear elements and the time variable is discretized using a Crank-Nicolson procedure.

Consider first the general approach. Let S be the set of real-valued, piecewise continuously differentiable functions, w(x), on (o,ℓ), and let S_m denote an m-dimensional subspace of S which is spanned by m basis functions, $w_i(x)$. Assume a solution to eq. (1) of the form

$$\theta_m(x,t) = \sum_{k=1}^{m} a_k(t)\, w_k(x) \tag{10}$$

The $a_k(t)$'s are determined in part by the initial and boundary conditions. An operator, L, is defined on θ by

$$L(\theta) = \frac{\partial\theta}{\partial t} - \frac{\partial}{\partial x}\left(D(\theta)\frac{\partial\theta}{\partial x} + K(\theta)\right) - R(\theta, x, t) \tag{11}$$

The remaining $a_k(t)$'s are determined from the relationship

$$(L(\theta_m), w_j) = \int_o^{\ell} L(\theta_m)\, w_j\, dx = 0,\ j = 2,3,\ldots,m-1 \tag{12}$$

for all $o<t<T$. Rearranging eq. (12) and integrating by parts one obtains a system of m-2 first-order differential equations which in matrix notation can be written as:

$$B\frac{da(t)}{dt} + A(\theta_m)\,\underline{a}(t) = S(\theta_m). \tag{13}$$

Here B is an (m-2) x (m-2) matrix with (i,j)th element equal

$\int_o^{\ell} w_i w_j dx$; $A(\theta_m)$ is an (m-2) x (m-2) matrix with

(i,j)th element equal to $\int_o^{\ell} D(\theta_m)\,\frac{dw_i}{dx}\,\frac{dw_j}{dx}\,dx$;

$\underline{a}(t)$ is an (m-2) x 1 matrix equal to $\begin{pmatrix} a_2(t) \\ a_3(t) \\ \vdots \\ a_{m-1}(t) \end{pmatrix}$; and $S(\theta_m)$ is an

(m-2) x 1 matrix with jth element

$$\int_o^{\ell} \left[\left(\frac{da_1}{dt}(t)\, w_1 + \frac{da_m}{dt}(t)\, w_m \right) w_j + D(\theta_m) \left(a_1(t) \frac{dw_1}{dx} + a_m(t) \frac{dw_m}{dx} \right) \frac{dw_j}{dx} + K(\theta_m) \frac{dw_j}{dx} - R(\theta_m, x, t)\, w_j \right] dx.$$

For the matrices in eq. (13) i = 2,3,...,m-1 and j = 2,3,...,m-1.

For linear elements, chapeau functions are used. The interval (o,ℓ) is divided into N subintervals with h_i denoting the length of the ith interval. The functions, w_i, are chosen so as to form what is called a local or patch basis since they are zero everywhere in (o,ℓ) except on at most two adjacent subintervals. The basis function is defined by the relation

$$w_{i+1}(x) = \begin{cases} \left(x - \sum_{k=1}^{i-1} h_k\right) / h_i & \text{on the ith subinterval} \\ \left(\sum_{k=1}^{i+1} h_i - x\right) / h_{i+1} & \text{on the (i-1)th subinterval} \\ 0 & \text{elsewhere on } (o,\ell). \end{cases} \tag{14}$$

Substitute these basis functions into eq. (13). $A(\theta_m)$ and B become (m-2) x (m-2) symmetric tridiagonal matrices.

The next step in determining the numerical approximation to eq. (1) involves the discretization of eq. (13) with respect to time. This was achieved using Crank-Nicolson extrapolation (Douglas and Dupont, 1970).

Define

$$a_i^j = a_i(j\Delta t) \qquad \begin{matrix} i = 1,2,\ldots,m \\ j = 0,\ldots,K \end{matrix}$$

and $\theta_m^j(x) = \theta_m(x, j\Delta t)$

where $\Delta t = T/K$. Then (13) becomes,

$$\left(\frac{1}{\Delta t} B + .5 A(1.5\, \theta_m^j - .5\, \theta_m^{j+1})\right) \underline{a}^{j+1} = \left(\frac{1}{\Delta t} B - .5 A(1.5\, \theta_m^j - .5\, \theta_m^{j-1})\right) \underline{a}^j + S(1.5\, \theta_m^j - .5\, \theta_m^{j-1}) \tag{1}$$

An optional corrector step can be indicated using the estimate from eq. (15), which is denoted by $\hat{\theta}_m^{j+1}$ (Douglas and Dupont, 1970). The corrector step is specified by

$$\left(\frac{1}{\Delta t}\ B + .5\ A(.5\ (\theta_m^j + \hat{\theta}_m^{j+1}))\right)\ \underline{a}^{j+1}$$
$$=\left(\frac{1}{\Delta t}\ B - .5\ A(.5\ (\theta_m^j + \hat{\theta}_m^{j+1}))\right)\ \underline{a}^{j} + S(.5\ (\theta_m^j + \hat{\theta}_m^{j+1})) \qquad (16)$$

The problem of using the finite element method to find a numerical solution to eq. (1) has now been reduced to solving a linear matrix equation for each j. When $j = 0$, $\underline{a}^0$ is determined using nodal values from the initial condition and thus θ_m^0 is known from eq. (10). Since θ_m^j and θ_m^{j-1} are required in eq. (15) to determine $\underline{a}^{j+1}$, eq. (15) cannot be applied to the calculation $\underline{a}^1$. For this initial case a predictor-corrector technique is used (Douglas and Dupont, 1970). For $j = 1,2,\ldots, K-1$, eq. (15) and eq. (16) define the procedure for evaluating $\underline{a}^{j+1}$, and from the boundary conditions a_1^j and a_m^j are evaluated.

An obstacle to the efficient application of Galerkin procedures for nonlinear equations of the type presented here is that the matrices in eq. (15) must be calculated at each time step. This involves performing an integration such as

$$\int_0^{\ell} D(1.5\ \theta_m^j - .5\ \theta_m^{j-1})\ \frac{dw_i}{dx}\ \frac{dw_k}{dx}\ dx \qquad (17)$$

for all i and k equal 2,3,... m-1. We considered this problem and tried to make our solution as efficient as possible. The integrals were calculated using Gaussian integration (Dahlquist et al., 1974) with two Gauss points per subinterval for linear elements. The result of this was that for example, only $D(1.5\ \theta_m^j - .5\ \theta_m^{j-1})$ had to be calculated for each Gauss point and then the required summations performed to evaluate $A(\theta_m)$ at each time step.

As has been pointed out, most of the elements in $A(\theta_m)$ and B are zero. This was taken advantage of in order to economize on program size and to improve efficiency. A technique described by Schwarz et al. (1973) for banded matrices was used to solve eq. (15) and eq. (16).

APPENDIX C

Listing of Computer Program Sample Application

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C----- ONE DIMENSIONAL SIMULATION MODEL FOR SOIL WATER TRANSPORT AND
C----- ROOT UPTAKE. THE DIFFUSION BASED MODEL IS SOLVED USING LINEAR
C----- FINITE ELEMENTS AND AN EXPLICIT TIME STEP
C----- CN(I) IS MOISTURE CONTENT AT NODE I AT TIME T
C----- CP(I) IS MOISTURE CONTENT AT NODE I AT TIME T-1
C----- DP(I) IS MOISTURE CONTENT AT NODE I AT TIME T+.5
C----- CS(I) IS MOISTURE CONTENT AT NODE I AT TIME T+1
C----- THE UNITS FOR SOIL MOISTURE ARE CC/CC
C----- COVER IS THE FRACTION OF SOIL SURFACE COVERED BY THE CROP CANOPY
C----- NLAY(I) IS THE NODE AT WHICH THE ITH SOIL TYPE BEGINS
C----- R(I) IS THE WIDTH OF OR OF THE ITH GRID-SUBINTERVAL
      DIMENSION CP(25),AU(25),AD(25),BC(25),BU(25),S(25),CD(25),CU(25)
      DIMENSION GP(2),BRC(100),FC(4),PWP(4),PAW(4),DPTH(4),NLAY(5),WI(4)
      DIMENSION ITP(4),WK(4),ISTAGE(5),ILAY(5),CO(4,5)
      DIMENSION PEVAP(100),PRECIP(100),DTABLE(100),CS(25),CN(25),GP(25),
     1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
      COMMON PEVAP,PRECIP,DTABLE,CS,CN,GP,N,THG,NDF,HKA,HWA,DIA,DPG,ZAE
C----- N IS THE NUMBER OF GRID-SUBINTERVALS IN THE PROFILE
C----- NSTAGE IS THE NUMBER OF DEFINED CROP STAGES
C----- ND IS THE TOTAL NUMBER OF DAYS TO BE SIMULATED
C----- NLAYR IS THE NUMBER OF DISTINCT SOIL TYPES IN THE PROFILE
C----- DT1 IS THE SPECIFIED TIME STEP
      READ(5,216) N,NSTAGE,ND,NLAYR,DT1
  216 FORMAT(4I3,F5.1)
      NT2=2*N
      NP1=N+1
      NP2=N+2
      NM1=N-1
      NM2=N-2
C----- READ ISTAGE(I) THE LENGTH IN DAYS OF THE ITH STAGE
      READ(5,222) (ISTAGE(I),I=1,NSTAGE)
C----- NOUT CONTROLS THE NUMBER OF SOIL MOISTURE SUMMARIES OUTPUT PER DAY
C----- JWAT INDICATES WHETHER A WATER TABLE IS SPECIFIED, IF
C----- JWAT IS GREATER THAN ZERO WATER TABLE DEPTHS ARE READ
C----- IC2 CONTROLS WATER BALANCE ADJUSTMENT
C----- IF IC2 IS GREATER THAN ZERO NO ADJUSTMENT IS MADE
C----- IC3 IS USED TO SELECT BOTTOM BOUNDARY CONDITION SPECIFICATION
C----- IC3=0 THEN CONTENT IS SPECIFIED AND FLUX CALCULATED
C----- IC3=1 THEN FLUX IS SPECIFIED AND CONTENT CALCULATED
      READ(5,222) NOUT,JWAT,IC2,IC3
  222 FORMAT(5I5)
      NLAY(NLAYR+1)=N+1
      READ(5,138) (R(I),I=1,N)
  138 FORMAT(16F5.2)
      DO 122 I=1,NLAYR
      READ(5,132) ITP(I),FC(I),PWP(I),PAW(I),WI(I),DPTH(I),WK(I),NLAY(I)
      WRITE(7,232)ITP(I),FC(I),PWP(I),PAW(I),WI(I),DPTH(I),WK(I),NLAY(I)
  122 CONTINUE
C-----
      CALL PARM(ITP,NLAYR,DPTH,FC,PWP,PAW,WI,CO,WK)
C-----
  132 FORMAT(I2,6F6.2,I2)
  232 FORMAT(1X,I2,6F6.2,I2)
C----- CALCULATE AND PRINT SOIL FUNCTIONS FOR EACH SOIL LAYER
C----- AT TEN EQUALLY SPACED WATER CONTENTS
      DO 60 I=1,NLAYR
      ILAY(I)=6*(I-1)+1
      DO 60 J=1,12
      I1=12*(I-1)+J
      DPG(I1)=(J-2)*CO(I,3)/10.
      IF(DPG(I1) .LE. 0.04)DPG(I1)=0.04
```

```
      THG(I1)=I
60    CONTINUE
      ILAY(NLAYR+1)=6*NLAYR+1
C-----
      CALL FUNL(PET,CO,NLAYR,ILAY,NN,I,NP)
C-----
      DO 234 I=1,NT2
234   HKA(I)=-HKA(I)
220   FORMAT(/9X,9HLAYER NO.,6X,20HWATER CONTENT(CC/CC),2X,16HCONDUCTIVITY HE
     CAD(CM),2X,20HCONDUCTIVITY(CC/MIN),2X,22HDIFFUSIVITY((CM*CM/MIN))
      WRITE(7,220)
      DO 224 J=1,NLAYR
      J1=12*(J-1)+3
      J2=12*J
      WRITE(7,212) ((THG(I),DPG(I),THA(I),HKA(I),DIA(I)),I=J1,J2)
224   CONTINUE
C---- CALCULATE NODE DEPTHS
      CN(1)=0.
      DO 46 I=1,N
46    CN(I+1)=CN(I)+R(I)
      WRITE(7,100)
100   FORMAT(/30X,17HNODE DEPTHS (M CM)
      WRITE(7,102) (CN(I),I=1,NP1)
102   FORMAT(12F10.2)
      IF(JWAT .LE. 0) GO TO 200
C-----
      CALL WTABLE(ND,NP1)
C-----
200   CONTINUE
      CO7=.04
      GP(1)=.2113249
      GP(2)=.7886751
C-----
C---- INITIAL CONDITIONS
C-----
      READ(5,134) (CN(I),I=1,NP1)
134   FORMAT(16F5.3)
      WRITE(7,216)
216   FORMAT(/20X,42HINITIAL WATER CONTENT AT THE NODES (CC/CC))
      WRITE(7,102) (CN(I),I=1,NP1)
      DO 4 I=1,NP1
4     DP(I)=CN(I)
      SPE=0.
      SRAF=0.
      SW=0.
      STSUM=0.
      SIRR=0.
C---- GLOBAL MASS MATRIX
      DO 6 I=1,NN2
6     CO(I)=R(I)/6.
      DO 8 I=1,NN1
8     CO(I)=(R(I)+R(I+1))/3.
C-----
      CALL METDAT(PEVAP,PRECIP,ND)
C-----
      NN1=0
C---- LOOP OVER CROP STAGES
C---- READ COVER AND ROOT PARAMETERS
      DO 11 I=1,NSTAGE
      NN2=ISTAGE(I)
C-----
```

```
1180          CALL ROOTDN(GP,N,COVER,ROOTFF)
1190     C----
1200     C---- DAILY INCREMENT LOOP
1220          DO 11 JDL=1,MD2
1230          MD1=MD1+1
1240          PE=PEVAP(MD1)
1250          W=PRECIP(MD1)
1260          IRU=0
1270          TSAE=0.
1280          TSWIN=0.
1290          SAE=0.
1300          SWIN=0.
1310          TFLA=0
1320          SUNR=6.
1330          SUNS=18.
1340          WST=0
1350          WEND=24.
1360          CNM=(CN(1)+CN(2)+CN(3))/3.
1370          WJDL=W
1380          DT=DT1
1390          IF(WJDL .LT. .5 .AND. CNM .LE. FC(1)) GO TO 124
1400          IF(CNM .LT. FC(1)) DT=.5*DT
1410          IF(CNM .LT. PWP(1))DT=.5*DT
1420          GO TO 126
1430     124  IF(CNM .LT. PWP(1)) DT=2.*DT
1440     126  CONTINUE
1450          MP=1440./DT
1460          JPP=MP/NOUT
1470     C----
1480     C---- PERIOD INCREMENT LOOP
1490     C----
1500          JP=0
1510          DO 10 J1=1,MP
1520          XP=0
1530          DO 80 I=1,N
1540     80   XP=XP+.5*R(I)*(CN(I)+CN(I+1))
1550          JP=JP+1
1560          KPC=0
1570     C----
1580          CALL PETFIT(PE,W,DT,SUNR,SUNS,WST,WEND,PET,J1)
1590     C----
1600     3    CONTINUE
1610          DO 12 I=1,NM1
1620          AU(I)=0
1630          AD(I)=0
1640       12 S(I)=0
1650          DO 150 I=1,NLAYR
1660          CO3=CO(I,3)
1670          NMIN=NLAY(I)+1
1680          NMAX=NLAY(I+1)
1690          IF(I .EQ. 1) NMIN=1
1700          DO 150 J=NMIN,NMAX
1710          IF(DP(J) .LT. CO7) DP(J)=CO7
1720          IF(DP(J) .GT. CO3) DP(J)=CO3
1730     150  CONTINUE
1750     C---- SET NODES BELOW WATER TABLE TO SATURATION
1770          IF(JWAT .LE. 0) GO TO 206
1780          DO 208 I=1,NLAYR
1790          CO3=CO(I,3)
1800          NMIN=NLAY(I)+1
1810          NMAX=NLAY(I+1)
```

```
      IF(I .EQ. 1) NMIN=1
      DO 208 J=NMIN,NMAX
      DP(J)=CO3
      CN(J)=CO3
  208 CONTINUE
  206 CONTINUE
      DO 204 I=1,N
      DO 204 J=1,2
      I1=2*(I-1)+J
      Y=GP(J)
  204 DPG(I1)=DP(I)*(1-Y)+DP(I+1)*Y
C-----
      CALL FUNL(PET,CO,NLAYR,NLAY,WI,WK)
C-----
  202 CONTINUE
      A1=0
      A2=0
      DO 42 I=1,NT2
      ZAE(I)=0.
   42 IF(PET .LE. 0.) GO TO 72
      IF(COVER .LE. 0.) GO TO 72
C-----
      CALL ROOTUP(N,COVER,PET,KPC,DT,IPU,UT3,ROOTEF)
C-----
   72 CONTINUE
      IF(NLAYR .LE. 1) GO TO 230
C-----
      CALL DISCON(CO,NLAYR,NLAY,WI,WK)
C-----
  230 CONTINUE
C---- ELEMENT INTEGRATION
      Z=2*(DP(1)-CN(1))/DT
      H=R(1)
      A3=0
      DO 14 I=1,2
      Y=GP(I)
      DI =DIA(I)
      HI=HKA(I)
      A3=A3+.5*H*Y*ZAE(I)
      A1=A1-.5*(Z*Y*(1.-Y)*H-DI*DP(1)/H+HI)
   14 A2=A2+.5*DI/H
      S(1)=A1-A3
      AD(1)=A2
      DO 16 I=2,NM1
      A1=0
      A2=0
      A3=0.
      H=R(I)
      DO 18 J=1,2
      I1=2*(I-1)+J
      A1=A1+.5*DIA(I1)
      A3=A3+.5*GP(J)*H*ZAE(I1)
   18 A2=A2+.5*HKA(I1)
      I1=I-1
      S(I1)=S(I1)+A2-A3
      S(I)=-A2-A3
      AD(I1)=AD(I1)+A1
      AD(I)=A1
   16 AU(I1)=-A1
      A1=0
      A2=0
```

```
2410          A3=0.
2420          Z=2*(DP(NP1)-CN(NP1))/DT
2430          H=R(N)
2440          DO 20 I=1,2
2450          Y=GP(I)
2460          I1=2*NM1+1
2470          DI=DIA(I1)
2480          HI=HKA(I1)
2490          A3=A3+Y*H*ZAE(I1)
2500          A1=A1-.5*(Z*Y*(1.-Y)*H-DI*DP(NP1)/H-HI)
2510       20 A2=A2+.5*DI/H
2520          S(NM1)=S(NM1)+A1-A3
2530          AD(NM1)=AD(NM1)+A2
2540    C-----
2550    C---- IMPLICIT TIME STEP
2560    C-----
2570          DO 22 I=1,NM2
2580          X=CU(I)/DT+.5*AU(I)
2590          Y=CU(I)/DT-.5*AU(I)
2600          AU(I)=X
2610       22 BU(I)=Y
2620          DO 24 I=1,NM1
2630          X=.5*AD(I)+CD(I)/DT
2640          Y=CD(I)/DT-.5*AD(I)
2650          AD(I)=X
2660       24 BD(I)=Y
2670    C-----
2680    C---- TRIDIAGONAL GAUSSIAN ELIMINATION
2690    C-----
2700          CP(2)=BD(1)*CN(2)+BU(1)*CU(3)+S(1)
2710          CP(N)=BU(NM2)*CN(NM1)+BD(NM1)*CN(N)+S(NM1)
2720          DO 26 I=3,NM1
2730       26 CP(I)=BU(I-2)*CN(I-1)+BD(I-1)*CN(I)+BU(I-1)*CN(I+1)+S(I-1)
2740          S(1)=AU(1)/AD(1)
2750          DO 28 I=2,NM2
2760       28 S(I)=AU(I)/(AD(I)-AU(I-1)*S(I-1))
2770          CP(2)=CP(2)/AD(1)
2780          DO 30 I=3,N
2790       30 CP(I)=(CP(I)-AU(I-2)*CP(I-1))/(AD(I-1)-AU(I-2)*S(I-2))
2800          CS(N)=CP(N)
2810          DO 32 I=1,NM2
2820          L=N-I
2830       32 CS(L)=CP(L)-S(L-1)*CS(L+1)
2832    C---- CALCULATE HI AND DI FOR EVAPORATION
2840          HI=.5*(HKA(2)+HKA(3))
2850          DI=.5*(DIA(2)+DIA(3))
2852    C---- CALCULATE HI AND DI FOR PRECIPITATION
2860          IF(W .LE. PE) GO TO 22H
2870          HI=.5*(HKA(1)+HKA(1))
2880          DI=.5*(DIA(1)+DIA(1))
2890    22H   CONTINUE
2900          CO3=CO(1,3)
2910    C-----
2920          CALL BCON(DT,SAE,HI,DI,PET,SWIN,CO3,COVER)
2930    C-----
2940    C---- SET BOTTOM BOUNDARY
2950    C---- CS(NP1)=DP(NP1)
2970          CS(NP1)=CS(N)
2980    C-----
2990          DO 154 I=1,NLAYR
3000          CO3=CO(I,3)
```

```
3010          NMIN=NLAY(I)+1
3020          NMAX=NLAY(I+1)
3030          IF(I .EQ. 1)NMIN=1
3040          DO 154 J=NMIN,NMAX
3050          IF(CS(J) .GT. C03) CS(J)=C03
3060     154  IF(CS(J) .LT. C07) CS(J)=C07
3070     C----
3080     C---- CHECK FOR PREDICTOR CORRECTOR OR EXTRAPOLATION
3090     C---- CORRECTOR STEP
3100     C----
3110          IF(KPC .GE. 1) GO TO 33
3120          KPC=KPC+1
3130          DO 56 I=1,NP1
3140     56   DP(I)=(CS(I)+CN(I))/2.
3150          GO TO 3
3170     C---- COMPLETE CALCULATIONS AND THEN START NEW TIME STEP
3190     33   CONTINUE
3200          BOTC=.5*R(N)*(CN(N)+CN(NP1))
3210          DO 36 I=1,NP1
3220          DP(I)=1.5*CS(I)-.5*CN(I)
3230       36 CN(I)=CS(I)
3240          TSAE=TSAE+SAE
3250          TSWIN=TSWIN+SWIN
3260          RAF=TSAE+TRU
3270     C----
3280     C---- BOTTOM BOUNDARY CONDITION
3290     C---- DETERMINE APPROPRIATE BOTTOM MOISTURE CONTENT FOR SPECIFIED BOTTOM
3300     C---- BOUNDARY CONDITION
3310     C---- BBC(I) IS THE BOTTOM BOUNDARY CONDITION FOR DAY I EITHER WATER
3320     C---- CONTENT(CC/CC) OR FLUX(CM/MIN), AN ALTERNATIVE IS TO ASSUME ZERO
3330     C---- GRADIENT ,I.E.,CN(N)=CN(NP1)
3340     C----
3350          IF(IC3 .GT. 2) GO TO 84
3360          H=R(N)
3370          DB=.5*(DIA(NT2-1)+DIA(NT2))
3380          HI=.5*(HKA(NT2-1)+HKA(NT2))
3390          IF(IC3 .GT. 1) GO TO 86
3400     C----
3410     C----GIVEN CONTENT ,CALCULATE FLUX
3420     C---- -VE FLUX DOWN +VE UPWARD
3430     C----
3440     C---- CN(NP1)=BBC(MD1)
3450          FLB=DB*(CN(N+1)-CN(N))/H+HI
3460          FLBP=FLB*DT
3470          TFLB=TFLB+FLBP
3480          GO TO 84
3490     C----
3500     C---- GIVEN FLUX ,CALCULATE CONTENT
3510     C----
3520     86   CONTINUE
3530     C---- FLB=BBC(MD1)
3540          CN(NP1)=CN(N)-H*(FLB+HI)/DB
3550          FLBP=FLB*DT
3560          TFLB=TFLB+FLBP
3570     84   CONTINUE
3580     C----
3590     C----  MOISTURE IN PROFILE
3600     C----
3610          X=(CN(1)*R(1)+CN(NP1)*R(N))/2.
3620          DO 44 I=2,N
3630     44   X=X+CN(I)*R(I)
```

```
      XP=XMOIST
      JPR=JDL*J1
      IF(JPR .EQ. 1) XP=X
      XMOIST=X
      IF(IC2 .GT. 0) GO TO 82
C-----
C-----CORRECTION FOR MOISTURE AND FLUX DIFFERENCE
C-----ASSUME WE CAN NEGLECT FLUX THRU BOTTOM
C-----
      Y=TFLR*TFLR
      IF(Y .GT. 0.0025) GO TO 82
      DX=X-XP
      DPTT=R(1)+R(2)+.5*R(3)
      DF=SWIN-DX
      TF=SAE+UT3
      IF(PFT .GT. 0.) DF=-TF-DX
      XMOIST=XMOIST+DF
      TDF=DF/DPTT
      TDFF=TDF*TDF
      IF(TDFF .GT. .0001)TDF=.01*TDF/(TDFF**.5)
      CN(1)=CN(1)+TDF
      CN(2)=CN(2)+TDF
      CN(3)=CN(3)+TDF
      CO3=CO(1,3)
      IF(CN(1) .GT. CO3) CN(1)=CO3
      IF(CN(1) .LT. CO7) CN(1)=CO7
      IF(CN(2) .GT. CO3) CN(2)=CO3
      IF(CN(2) .LT. CO7) CN(2)=CO7
82    CONTINUE
      IF(JP .NE.JPP) GO TO 10
      JP=0
      TIMJ1=J1*DT/60.
      WRITE(7,62)MD1,TIMJ1
      WRITE(6,62)MD1,TIMJ1
62    FORMAT(/1X,3HDAY,I10,5X,4HHOUR,F12.2)
      WRITE(7,66) XMOIST
66    FORMAT(/1X,16HWATER IN PROFILE,F10.2,2X,2HCM)
44    FORMAT(/1X,33HWATER CONTENT AT THE NODES(CC/CC))
      WRITE(7,64)
      WRITE(7,38) (CN(I),I=1,NP1)
      WRITE(6,38) (CN(I),I=1,NP1)
      WRITE(7,116) TFLR
   10 CONTINUE
      WRITE(7,140) IC,JDL,MD1
210   FORMAT(/3X,5HLAYER,3X,13HTHICKNESS(CM),2X,15HAV MOIST(CC/CC),2X,28
     CHWATER CONTENT(PERCENT AVAIL))
140   FORMAT(//1X,5HSTAGE,I10,4X,9HSTAGE DAY,I10,4X,7HDAY NO.,I10)
      WRITE(7,210)
      DO 146 I=1,NLAYR
      NMIN=NLAY(I)
      NMAX=NLAY(I+1)-1
      XWAT=0.
      DO 142 J=NMIN,NMAX
      I1=2*(J-1)
142   XWAT=XWAT+R(J)*(DPG(I1+1)+DPG(I1+2))/2.
      AXW=XWAT/DPTH(I)
      PAXW=(AXW-PWP(I))/(FC(I)-PWP(I))
      PAXW=PAXW*100.
      WRITE(7,144) I,DPTH(I),AXW,PAXW
146   CONTINUE
144   FORMAT(I5,3F16.5)
```

```
4250          SPE=SPE+PE
4260          SRAE=SRAE+RAE
4270          SW=SW+W
4280          STSWIN=STSWIN+TSWIN
4290          STRU=STRU+TRU
4300          WRITE(7,48)
4310          WRITE(7,50)
4320    48    FORMAT(/14X,17HDAILY VALUES (CM),18X,22HCUMULATIVE VALUES (CM))
4330    50    FORMAT(/4X,2HPE,5X,2HAE,5X,5HTRANS,2X,6HPRECIP,2X,6HINFILT,4X,2HPE
4340         C,6X,2HAE,4X,5HTRANS,2X,6HPRECIP,2X,6HINFILT)
4350          WRITE(6,52) PE,RAE,TRU,W,TSWIN,SPE,SRAE,STRU,SW,STSWIN
4360          WRITE(7,52) PE,RAE,TRU,W,TSWIN,SPE,SRAE,STRU,SW,STSWIN
4370    52    FORMAT(10F8.3)
4380          WRITE(7,66) XMOIST
4390          WRITE(6,66) XMOIST
4400          IF(IC3 .GT. 0) GO TO 11
4410          WRITE(7,116) TFLR
4420    116   FORMAT(/1X,45HFLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT),E12.4,
4430         C3X,2HCM)
4440          WRITE(7,214)
4450    214   FORMAT(/9X,9HDEPTH(CM),6X,20HWATER CONTENT(CC/CC),2X,16HSUCTION HE
4460         CAD(CM),2X,20HCONDUCTIVITY(CM/MIN),2X,22HDIFFUSIVITY(CM*CM/MIN))
4470          DO 118 I=1,NT2
4480    118   HKA(I)=-HKA(I)
4490          WRITE(7,212) ((THG(I),PPG(I),HKA(I),HKA(I),DTA(I)),I=1,NT2)
4500    212   FORMAT(5E20.4)
4510    11    CONTINUE
4520       38 FORMAT(12E10.4)
4530    39    FORMAT(115)
4540          STOP
4550          END
4552    C
4554    C
4556    C
4560          SUBROUTINE PARM(ITP,NLAYR,DPTH,FC,PWP,PAW,WS,CO,WK)
4570          DIMENSION ITP(4),DPTH(4),FC(4),PWP(4),WS(4),CO(4,8),PAW(4),WK(4)
4580    C-----
4590    C-----  PARAMETER AND FUNCTION SPECIFICATION FOLLOW CLAPP AND HORNBERGER
4600    C-----  CO1 IS THE EMPIRICAL EXPONENT H
4610    C-----  CO2 IS THE "SATURATION" SUCTION (LOG AVERAGE)
4620    C-----  CO3 IS THE SATURATED WATER CONTENT
4630    C-----  CO4 IS THE SATURATED HYDRAULIC CONDUCTIVITY
4640    C-----  CO5,CO6 ARE EMPIRICAL COEFFICIENTS IN THE PARABOLA FIT TO THE SATURATION
4650    C-----  END OF THE SOIL-WATER SUCTION HEAD FUNCTION
4660    C-----  WI IS THE INFLECTION POINT ON THE SOIL-WATER SUCTION HEAD FUNCTION
4670    C-----  WKI IS THE INFLECTION POINT ON THE HYDRAULIC CONDUCTIVITY FUNCTION
4680    C-----
4690          SFC=344.
4700          SPWP=15000.
4710          FCK=.00001
4720          DO 80 I=1,NLAYR
4730          WKI=WK(I)
4740          WI=WS(I)
4750          ITYPE=ITP(I)
4760          WRITE(7,120)
4770    120   FORMAT(/2X,5HLAYER,2X,13HTHICKNESS(CM),2X,19HAVAILABLE WATER(CM),2
4780         CX,16HFIELD CAP(CC/CC),2X,15HP WILT P(CC/CC))
4790          GO TO (2,4,6,8,10,12,14,16,18,20,22,24),ITYPE
4800    2     CO1=4.05
4810          CO2=3.5
4820          CO3=.395
```

```
4830            C04=1.056
4840            GO TO 50
4850      4     C01=4.34
4860            C02=1.78
4870            C03=.410
4880            C04=.938
4890            GO TO 50
4900      6     C01=4.90
4910            C02=7.18
4920            C03=.435
4930            C04=.208
4940            GO TO 50
4950      8     C01=5.30
4960            C02=56.6
4970            C03=.485
4980            C04=.0432
4990            GO TO 50
5000      10    C01=5.39
5010            C02=14.6
5020            C03=.451
5030            C04=.0417
5040            GO TO 50
5050      12    C01=7.12
5060            C02=8.63
5070            C03=.420
5080            C04=.0378
5090            GO TO 50
5100      14    C01=7.75
5110            C02=14.6
5120            C03=.477
5130            C04=.0102
5140            GO TO 50
5150      16    C01=8.52
5160            C02=36.1
5170            C03=.476
5180            C04=.0147
5190            GO TO 50
5200      18    C01=10.4
5210            C02=6.16
5220            C03=.426
5230            C04=.0130
5240            GO TO 50
5250      20    C01=10.4
5260            C02=17.4
5270            C03=.492
5280            C04=.0062
5290            GO TO 50
5300      22    C01=11.4
5310            C02=18.6
5320            C03=.482
5330            C04=.0077
5340            GO TO 50
5350      24    READ(5,124) C01,C02,C03,C04
5360      124   FORMAT(4F9.6)
5370      50    CONTINUE
5380      C-----
5390      C-----  ADJUST C02 TO FIT A SPECIFIED PLANT AVAILABLE WATER. IF THE
5400      C-----  SPECIFIED LEVEL IS LESS THAN OR EQUAL TO ZERO,NO ADJUSTMENT IS MADE
5410      C-----
5420            CAP=PAW(I)/DPTH(1)
5430            IF(CAP .LE. 0.) GO TO 60
```

```
5440          X=1./C01
5450          Y=1.-(SFC/SPWP)**X
5460          C02= SFC*(CAP/(C03*Y))**C01
5470          Z=C03*(C02/SFC )**X
5480          IF(Z .GT. WI*C03) C02=SFC **WI**C01
5490     40   CONTINUE
5500     C----
5510     C----- ADJUST C01 AND C02 TO FIT THE SOIL-WATER SUCTION HEAD FUNCTION
5520     C----- THROUGH A SPECIFIED PERMANENT WILTING POINT AND FIELD CAPACITY
5530     C----- IF THE SPECIFIED FIELD CAPACITY IS LESS THAN OR EQUAL TO ZERO
5540     C----- NO ADJUSTMENT IS MADE
5550     C----
5560          CFC=FC(I)
5570          IF(CFC .LE. 0.) GO TO 70
5580          CPWP=PWP(I)
5590          X=SPWP/SFC
5600          W0=CPWP/C03
5610          WI=CFC/C03
5620          Y=WI/W0
5630          C01=ALOG(X)/ALOG(Y)
5640          C02=SPWP*W0**C01
5650     70   CONTINUE
5660          PI=C02*WI**(-C01)
5670          X=1-WI
5680          C05=PI*(WI-X*C01)/(WI*X*X)
5690          C06=2*WI-1-PI*C01/(C05*WI)
5700          C0(I,1)=C01
5710          C0(I,2)=C02
5720          C0(I,3)=C03
5730          C0(I,4)=C04
5740          C0(I,5)=C05
5750          C0(I,6)=C06
5760          C0(I,7)=C07
5770          C0(I,8)=C08
5780          A1=1./C01
5790     C----
5800     C----- CALCULATE FIELD CAPACITY AND PERMANENT WILTING POINT
5810     C----
5820          FC(I)=C03*(C02/SFC )**A1
5830          PWP(I)=C03*(C02/SPWP )**A1
5840          PAW(I)=DPTH(I)*(FC(I)-PWP(I))
5850     C----
5860     C----- SET NEW COEFFICIENT IN HYDRAULIC CONDUCTIVITY,C07,TO FORCE FUNCTION
5870     C----- THROUGH A SPECIFIED POINT,THE HYDRAULIC CONDUCTIVITY IS FIT WITH
5880     C----- A PARABOLA BETWEEN WKI AND SATURATION SUCH THAT THE SATURATED HYDRAULIC
5890     C----- CONDUCTIVITY IS AS SPECIFIED.IF WKI IS GREATER THAN OR EQUAL TO ONE
5900     C----- NO ADJUSTMENT IS MADE
5910     C----
5920          C07=C04
5930          IF(WKI .GE. 1.) GO TO 75
5940          X=FC(I)/C03
5950          Y=-(2.*C01+3.)
5960          C07=FCK*X**Y
5970          IF(C07 .GT. C04) C07=C04
5980     75   CONTINUE
5990          C0(I,7)=C07
6000          WRITE(7,122) I,DPTH(I),PAW(I),FC(I),PWP(I)
6010     122  FORMAT(I5,4F16.4)
6020     80   CONTINUE
6030          WRITE(7,128)
6040     128  FORMAT(/25X,22HCOEFFICIENTS FOR LAYER)
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```
      WRITE(7,126)
126   FORMAT(4X,3HCO1,9X,3HCO2,9X,3HCO3,9X,3HCO4,9X,3HCO5,9X,3HCO6,9X,3
     CHCO7,9X,3HCO8)
      WRITE(7,38) ((CO(I,J),J=1,8),I=1,NLAYR)
38    FORMAT(8E12.4)
      RETURN
      END
C
C
C
      SUBROUTINE WTABLE(MD,NP1)
      DIMENSION PEVAP(100),PRECIP(100),DTABLE(100),CS(25),CN(25),DP(25),
     1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
      COMMON PEVAP,PRECIP,DTABLE,CS,CN,DP,R,THG,RDF,HKA,HWA,DIA,DPG,ZAE
C-----
C-----  GIVEN WATER TABLE DEPTH (DTABLE(I)) ON DZY I, THIS PROGRAM DETERMINES
C-----  THE INDEX OF THE FIRST NODE LYING WITHIN THE WATER TABLE AND
C-----  STORES THE RESULT IN DTABLE(I)
C-----
      READ(5,5) (DTABLE(I),I=1,MD)
      WRITE(7,5) (DTABLE(I),I=1,MD)
      DO 10 I=1,MD
      DO 20 J=1,NP1
      JI=NP1-(J-1)
      IF(DTABLE(I) .LT. CN(JI)) GO TO 20
      DTABLE(I)=JI
      GO TO 10
20    CONTINUE
10    CONTINUE
5     FORMAT(10F7.2)
      RETURN
      END
C
C
C
      SUBROUTINE METDAT(PEVAP,PRECIP,MD)
      DIMENSION PEVAP(100),PRECIP(100)
      IMET=2
      GO TO (2,4),IMET
C-----
C-----  READ PE AND PRECIP
C-----
2     DO 6 I=1,MD
      READ(5,58) PEVAP(I),PRECIP(I)
      WRITE(7,58) PEVAP(I),PRECIP(I)
6     CONTINUE
58    FORMAT(2F5.2)
      GO TO 10
C-----
C-----  GENERATE PE AND PRECIP FROM BASIC WEATHER RECORDS
C-----
4     CONTINUE
      DO 12 I=1,MD
      PEVAP(I)=.7
      PRECIP(I)=0.
12    CONTINUE
      DO 14 I=1,2
      II=10*(I-1)+1
      PRECIP(II)=3.
      PRECIP(1)=0.
10    CONTINUE
```

```
      RETURN
      END
C
C
C
      SUBROUTINE ROOTDN(GP,X,COVER,ROOTEF)
      DIMENSION GP(2),X(50),Y(50)
      DIMENSION PEVAP(100),PRECIP(100),DTABLE(100),CS(25),CM(25),DP(25),
     1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
      COMMON PEVAP,PRECIP,DTABLE,CS,CM,DP,R,THG,RDF,HKA,HWA,DIA,DPG,ZAE
C-----
C-----  THIS SUBROUTINE GENERATES THE ROOT DENSITY AT GAUSS POINTS WITHIN
C-----  GRID SUBINTERVALS
C-----  THG(I) IS THE LOCATION OF THE ITH GAUSS POINT
C-----  RDF(I) IS THE ROOT DENSITY (GM PER CUBIC CM) AT THG(I)
C-----  R(I) IS THE THICKNESS OF THE ITH GRID SUBINTERVAL (CM)
C-----
      READ(5,100) IROOT,ROOTEF,COVER
  100 FORMAT(I3,2F4.2)
      TH=0.
      DO 2 I=1,N
      H=R(I)
      DO 4 J=1,2
      II=2*(I-1)+J
    4 THG(II)=TH+GP(J)*H
    2 TH=TH+R(I)
      IF(COVER .LE. 0.) GO TO 14
      N2=2*N
      GO TO (6,8),IROOT
    6 READ(5,102)A,B
      DO 10 I=1,N2
   10 RDF(I)=A*EXP(-B*THG(I))
      GO TO 50
  102 FORMAT(2F10.2)
    8 M=0
   12 M=M+1
      READ(5,102) DEPTH,RDEN
      X(M)=DEPTH
      Y(M)=RDEN
      IF(DEPTH .GE. 0.) GO TO 12
      MAX=M-1
C-----
      CALL INTERP(THG,RDF,X,Y,MAX,N2)
C-----
   50 CONTINUE
      WRITE(7,104)
  104 FORMAT(/3X,40HROOT DENSITY (GM PER CC) AT GAUSS POINTS)
      WRITE(7,106)
  106 FORMAT(/3X,16HDEPTH    DENSITY)
      DO 14 I=1,N2
      WRITE(7,102) THG(I),RDF(I)
   14 CONTINUE
      RETURN
      END
C
C
C
      SUBROUTINE PETFIT(PE,V,DT,SUMP,SUMS,WST,WEMD,PET,J1)
C-----
C-----  PE IS DAILY POTENTIAL EVAPOTRANSPIRATION IN CM
C-----  V IS RAINFALL IN CM
```

```
C----- SUNR,SUNS ARE TIMES OF SUNRISE AND SUNSET IN HOURS
C----- WST,WEND ARE TIMES OF START AND END OF RAINFALL IN HOURS
C----- PET IS POTENTIAL SURFACE FLUX IN CM PER MIN FOR TIME PERIOD J1
C-----
      DAYL=SUNS-SUNR
      TIME=J1*DT/60.
      PET=0
      PET1=0.
      PET2=0.
      IF(PE .LE. 0.)GO TO 5
      IF(TIME .LT. SUNR .OR. TIME .GT. SUNS) GO TO 5
      PET1=1.5708*PE*SIN(3.14159*((TIME-SUNR)/DAYL))/(60.*DAYL)
5     IF(W .LE. 0.) GO TO 10
      IF(TIME .LT. WST .OR. TIME .GT. WEND) GO TO 10
      PET2=-W/((WEND-WST)*60.)
10    CONTINUE
      PET=PET1+PET2
      RETURN
      END
C
C
C
      SUBROUTINE ROOTUP(N,COVER,PET,KPC,DT,TRU,UT3,ROOTEF)
      DIMENSION PEVAP(100),PPRECIP(100),OTABLE(100),CS(25),CN(25),DP(25),
     1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
      COMMON PEVAP,PRECIP,OTABLE,CS,CN,DP,R,THG,RDF,HKA,HWA,DIA,DPG,ZAE
C-----
C----- ZAE IS ROOT WATER UPTAKE AT GAUSS POINTS
C----- UT3 IS THE ROOT WATER UPTAKE FOR THE PROFILE IN TIME DT
C----- TRU IS THE CUMULATIVE TOTAL ROOT WATER UPTAKE PER DAY
C-----
      RP=15000
      DO 70 I=1,50
70    ZAE(I)=0.
15    UT=0.
      DO 13 I=1,N
      H=R(I)
      DO 13 J=1,2
      I1=2*(I-1)+J
      ZAE(I1)=HKA(I1)*(HWA(I1)-RP)*RDF(I1)*ROOTEF
C----- ZERO UPTAKE FOR LIMITING OXYGEN
      IF(HWA(I1) .LT. 50.)ZAE(I1)=0.
      IF(ZAE(I1) .LT. 0.) ZAE(I1)=0.
      UT=UT+.5*ZAE(I1)*H
      X=-COVER*PET
      IF(-UT .LT. X) GO TO 19
      GO TO 13
19    UT=UT-.5*ZAE(I1)*H
      IF(UT .LT. 0.) UT=0.
      ZAE(I1)=-(X+UT)/(.5*H)
      GO TO 17
13    CONTINUE
C-----
C----- CHECK FOR PREDICTOR CORRECTOR AND SET UT3 AND TRU IF ON CORRECTOR
C-----
17    IF(KPC .NE. 1) GO TO 72
      UT3=0.
      DO 74 I=1,N
      H=R(I)
      DO 74 J=1,2
      I1=2*(I-1)+J
```

```
7710    74      UT3=UT3+ZAE(I1)*W*DT*.5
7720            TRU=UT3+TRU
7730    72      CONTINUE
7740            RETURN
7750            END
7752    C
7754    C
7756    C
7760            SUBROUTINE FUNL(PET,CO,NLAYR,NLAY,WS,WK)
7770            DIMENSION Y(2),WS(4),CO(4,8),NLAY(5),WK(4)
7780            DIMENSION PEVAP(100),PRECIP(100),DTABLE(100),CS(25),CN(25),DP(25),
7790           1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
7800            COMMON PEVAP,PRECIP,DTABLE,CS,CN,DP,R,THG,RDF,HKA,HWA,DIA,DPG,ZAE
7810            JMIN=1
7820            DO 50 I=1,NLAYR
7830            WK1=WK(I)
7840            WI=WS(I)
7850            CO1=CO(I,1)
7860            CO2=CO(I,2)
7870            CO3=CO(I,3)
7880            CO4=CO(I,4)
7890            CO5=CO(I,5)
7900            CO6=CO(I,6)
7910            CO7=CO(I,7)
7920            CO8=CO(I,8)
7930            NMIN=NLAY(I)
7940            NMAX=NLAY(I+1)
7950            IF(I .EQ. NLAYR) NMAX=NLAY(I+1)-1
7960            DO 40 J=NMIN,NMAX
7970            DO 45 J1=JMIN,2
7980            I1=2*(J-1)+J1
7990            X=DPG(I1)
8000            X=X/CO3
8010            IF(X .GT. 1.)X=1.
8012    C-----
8020    C-----  ENTER ALTERNATE HYDRAULIC CONDUCTIVITY FUNCTION (CM PER MIN) USING
8030    C-----  CO(I,J) TO SPECIFY COEFFICIENTS IF REQUIRED THEN GO TO 60
8040    C-----  NOTE THAT X IN THIS SUBROUTINE IS THE VOLUMETRIC WATER CONTENT DIVIDED
8050    C-----  BY THE SATURATED WATER CONTENT
8052    C-----
8060            HK1=CO7*X**(2.*CO1+3.)
8070            IF(X .LE. WK1) GO TO 60
8080            IF(WK1 .GE. 1.)GO TO 60
8090            Z=(X-WK1)/(1.-WK1)
8100            HK1=HK1+(CO4-CO7)*Z**7
8110    60      CONTINUE
8120            HK1=HK1
8122    C-----
8130    C-----  ENTER ALTERNATE SOIL-WATER SUCTION HEAD FUNCTION (CM) AND ITS DERIVATIVE
8140    C-----  USING CO(I,J) TO SPECIFY COEFFICIENTS IF REQUIRED THEN GO TO 30
8142    C-----
8150            IF(X .GT. WI) GO TO 20
8160            HW1=CO2/(X**CO1)
8170            DERIV=CO1*CO2/(CO3*X**(CO1+1))
8180            GO TO 30
8190    20      CONTINUE
8200            HW1=CO5*(X-CO6)*(1-X)
8210            DERIV=CO5*(2.*X-(CO6+1))/CO3
8220    30      CONTINUE
8230            DIA(I1)=-HK1*DERIV
8240            HWA(I1)=HW1
```

```
8250            HKA(I1)=HK1
8260      45    CONTINUE
8270            JMIN=1
8280      40    CONTINUE
8290            JMIN=2
8300      50    CONTINUE
8310            RETURN
8320            END
8327      C
8324      C
8326      C
8330            SUBROUTINE DISCON(CO,NLAYR,NLAY,WS,WK)
8340            DIMENSION Y(2),WS(4),CO(4,6),NLAY(5),WK(4)
8350            DIMENSION PEVAP(100),PRECIP(100),DTABLE(100),CS(25),CN(25),DP(25),
8360           1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
8370            COMMON PEVAP,PRECIP,DTABLE,CS,CN,DP,R,THG,RDF,HKA,HWA,DIA,DPG,ZAE
8372      C-----
8380      C-----  ADJUST FOR CHANGE IN SUCTION HEAD FUNCTION (CN)
8390      C-----  XAV DENOTES A MEAN STANDARDIZED WATER CONTENT FOR THE INTERFACE LAYER
8400      C-----  DERIV DENOTES THE CHANGE IN SUCTION HEAD FOR FIXED XAV ACROSS
8410      C-----  THE INTERFACE LAYER
8412      C-----
8420            DO 70 I=2,NLAYR
8430            I1=I-1
8440            J1=NLAY(I)
8450            J2=2*J1-1
8460            J3=J2+1
8470            XAV=.5*(DPG(J2)/CO(I1,3)+DPG(J3)/CO(I,3))
8480            I2=1
8490            DO 74 J=I1,1
8492      C-----
8500      C-----  ENTER ALTERNATE SOIL WATER SUCTION HEAD FUNCTION (CN)
8510      C-----  EVALUATE ALTERNATE FUNCTION THEN GO TO 78
8512      C-----
8520            WI=WS(J)
8530            WI=1.
8540            IF(XAV .GT. WI)GO TO 80
8550            Y(I2)=CO(J,2)/(XAV**CO(J,1))
8560            GO TO 78
8570      80    Y(I2)=CO(J,5)*(XAV-CO(J,6))*(1.-XAV)
8580            IF(Y(I2) .LT. 0.)Y(I2)=0.
8590      78    CONTINUE
8600            I2=I2+1
8610      74    CONTINUE
8620            DERIV=(Y(2)-Y(1))/R(J1)
8630            Z=1.+DERIV
8640            DO 90 J=J2,J3
8650            Z1=HKA(J)
8660            Z1=Z1*Z
8670            Z2=Z1*Z1
8680            IF(Z2 .GT. 100.)Z1=10.*Z1/(Z2**.5)
8690            HKA(J)=Z1
8700      90    CONTINUE
8710      70    CONTINUE
8720      95    CONTINUE
8730            RETURN
8740            END
8742      C
8744      C
8746      C
8750            SUBROUTINE BCON(DT,SAE,HI,DI,PEI,SWIN,CO3,COVER)
```

```
      DIMENSION PEVAP(100),PRECIP(100),DTABLE(100),CS(25),CN(25),DP(25),
     1R(25),THG(50),RDF(50),HKA(50),HWA(50),DIA(50),DPG(50),ZAE(50)
      COMMON PEVAP,PRECIP,DTABLE,CS,CN,DP,R,THG,RDF,HKA,HWA,DIA,DPG,ZAE
C-----
C----- PET +VE FOR EVAP, -VE FOR PRECIP
C----- SAE IS AE FOR PERIOD DT (+VE)
C----- SWIN IS ACTUAL PRECIP ENTERING SOIL FOR DT (+VE)
C-----
      ISURF=1
      IF(PET .GE. 0.)ISURF=0
      C07=.04
      IF(CS(2) .GT. C03)CS(2)=C03
      IF(CS(2) .LT. C07)CS(2)=C07
      H=R(1)
      SAE=0
      SWIN=0
      PETS=PET
      IF(PET .GE. 0.) PET=(1.-COVER)*PET
    1 CONTINUE
      I1=0
      IF(PET .GT. 0) I1=1
    8 TT=-PET
C-----
C----- SELECT FLUX-CONCENTRATION BOUNDARY OR IMAGINARY LAYER ROUTINE
C-----
      IF(ISURF .GT.0) GO TO 16
C----- CALCULATION OF CS(1) FOR  EVAP OR PRECIP
C----- ASSUME CS(1) IN OPEN INTERVAL (C07,C03)
      CS(1)=H*(TT+HI)/DI+CS(2)
      IF(CS(1) .GT. C03 ) GO TO 10
      IF(CS(1) .LT. C07) GO TO 14
      IF(I1 .EQ. 1) SAE=    PET*DT
      IF(I1 .EQ. 0) SWIN =    -PET*DT
      GO TO 12
   10 FLUX=DI*(DP(2)-C03 )/H+HI
      TT=PET
      TT2=TT*TT
      FLUX2=FLUX*FLUX
      IF(FLUX2 .GE. TT2) FLUX=TT
      IF(I1 .EQ. 1) SAE=    FLUX*DT
      IF(I1 .EQ. 0) SWIN=    -FLUX*DT
      GO TO 12
   14 FLUX=DI*(DP(2)-C07)/H+HI
      IF(I1 .EQ. 1) SAE=    FLUX*DT
      IF(I1 .EQ. 0) SWIN =    -FLUX*DT
   12 CONTINUE
      IF(CS(1) .LE. C07) CS(1)=C07
      IF(CS(1) .GE. C03 ) CS(1)=C03
      GO TO 30
C-----
C----- IMAGINARY LAYER ROUTINE (.5 H THICK)
C-----
   16 CONTINUE
      SC=CN(1)*.5*H
      C03=C03*.5*H
      C07=C07*.5*H
      F2=DI*(DP(2)-DP(1))/H+HI
      SCN=SC+(TT+F2)*DT
      F1=TT
      IF(SCN .LT. C07) GO TO 18
      GO TO 20
```

```
9370    18      SCN=CO7
9380            F1=(SCN-SC)/DT-F2
9390            GO TO 24
9400    20      IF(SCN .GT. CO3 ) GO TO 22
9410            GO TO 24
9420    22      SCN=CO3
9430            F1=(SCN-SC)/DT-F2
9440    24      CONTINUE
9450            CS(1)=SCN/(.5*H)
9460            F12=F1*F1
9470            TT2=TT*TT
9480            IF(F12 .GT. TT2) F1=TT
9490            IF(I1 .EQ. 0) SWIN=F1*DT
9500            IF(I1 .EQ. 1) SAE=-F1*DT
9510            CO3=CO3/(.5*H)
9520    30      CONTINUE
9530            PET=PETS
9540            RETURN
9550            END
9552    C
9554    C
9556    C
9560            SUBROUTINE INTERP(XINTRP,CINTRP,X,Y,N,M)
9570            DIMENSION CINTRP(50),XINTRP(50),X(50),Y(50)
9580            NM1=N-1
9590            I=1
9600            DO 20 J=1,NM1
9610    30      CONTINUE
9620            IF(XINTRP(I) .GT. X(J+1)) GO TO 20
9630            XO=(XINTRP(I)-X(J))/(X(J+1)-X(J))
9640            CINTRP(I)=Y(J)+(Y(J+1)-Y(J))*XO
9650            I=I+1
9660            IF(I .GT. M) GO TO 40
9670            GO TO 30
9680    20      CONTINUE
9690    40      RETURN
9700            END
```

```
 6  0.00  0.00  0.00  0.92 30.00  0.90 1
11  0.00  0.00  0.00  0.97 90.00  0.90 8

LAYER  THICKNESS(CM)   AVAILABLE WATER(CM)   FIELD CAP(CC/CC)   P WILT P(CC/CC)
  1       30.0000              3.0901             0.2503             0.1473

LAYER  THICKNESS(CM)   AVAILABLE WATER(CM)   FIELD CAP(CC/CC)   P WILT P(CC/CC)
  2       90.0000              9.4678             0.3732             0.2680

                        COEFFICIENTS FOR LAYER
      CO1           CO2           CO3           CO4           CO5           CO6           CO7           CO8
0.7120E+01    0.8630E+01    0.4200E+00    0.3790E-01    0.9299E+03    0.7100E+00    0.3780E-01    0.0000E+00
0.1140E+02    0.1860E+02    0.4820E+00    0.7700E-02    0.6538E+02   -0.8280E+01    0.7371E-02    0.0000E+00

     LAYER NO.      WATER CONTENT(CC/CC)   SUCTION HEAD(CM)   CONDUCTIVITY(CM/MIN)   DIFFUSIVITY(CM*CM/MIN)
    0.1000E+01          0.4200E-01          0.1139E+09          0.2175E-18             0.4195E-08
    0.1000E+01          0.8400E-01          0.8179E+06          0.3367E-13             0.2334E-05
    0.1000E+01          0.1260E+00          0.4559E+05          0.3656E-10             0.9421E-04
    0.1000E+01          0.1680E+00          0.5880E+04          0.5212E-08             0.1299E-02
    0.1000E+01          0.2100E+00          0.1290E+04          0.2442E-06             0.9939E-02
    0.1000E+01          0.2520E+00          0.3278E+03          0.5660E-05             0.5242E-01
    0.1000E+01          0.2940E+00          0.1094E+03          0.8072E-04             0.2138E+00
    0.1000E+01          0.3360E+00          0.4227E+02          0.5068E-03             0.7226E+00
    0.1000E+01          0.3780E+00          0.1827E+02          0.6147E-02             0.2116E+01
    0.1000E+01          0.4200E+00          0.0000E+00          0.3786E-01             0.2427E+02
    0.1000E+01          0.4820E-01          0.4672E+13          0.1168E-27             0.1291E-12
    0.2000E+01          0.9640E-01          0.1729E+10          0.6825E-20             0.1395E-08
    0.2000E+01          0.1446E+00          0.1700E+08          0.2384E-15             0.3194E-06
    0.2000E+01          0.1928E+00          0.6399E+06          0.3987E-12             0.1508E-04
    0.2000E+01          0.2410E+00          0.5026E+05          0.1262E-09             0.3000E-03
    0.2000E+01          0.2892E+00          0.6289E+04          0.1393E-07             0.3452E-02
    0.2000E+01          0.3374E+00          0.1085E+04          0.7431E-06             0.2724E-01
    0.2000E+01          0.3856E+00          0.2367E+03          0.2329E-04             0.1630E+00
    0.2000E+01          0.4338E+00          0.6182E+02          0.3864E-03             0.7902E+00
    0.2000E+01          0.4820E+00          0.0000E+00          0.7700E-02             0.9693E+01

                        NODE DEPTHS IN CM
  0.00     4.00     8.00    12.00    16.00    20.00    27.00    30.00    33.00    38.00    44.00    50.00
 60.00    70.00    80.00    90.00   100.00   110.00   120.00

                    INITIAL WATER CONTENT AT THE NODES (CC/CC)
  0.25     0.25     0.25     0.25     0.25     0.25     0.25     0.25     0.37     0.37     0.37     0.37
  0.37     0.37     0.37     0.37     0.37     0.37     0.37

ROOT DENSITY (GM PER CC) AT GAUSS POINTS

  DEPTH     DENSITY
   0.85       3.91
   3.15       1.87
   4.85       1.09
   7.15       0.52
   8.85       0.30
  11.15       0.14
  12.85       0.08
  15.15       0.04
  16.85       0.02
  19.15       0.01
  21.48       0.01
  25.52       0.00
  27.63       0.00
  29.37       0.00
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 30.63      0.00
 32.37      0.00
 34.06      0.00
 36.94      0.00
 39.27      0.00
 42.73      0.00
 45.27      0.00
 48.73      0.00
 52.11      0.00
 57.89      0.00
 62.11      0.00
 67.89      0.00
 72.11      0.00
 77.89      0.00
 82.11      0.00
 87.89      0.00
 92.11      0.00
 97.89      0.00
102.11      0.00
107.89      0.00
112.11      0.00
117.89      0.00
DAY          1      HOUR         8.00
WATER IN PROFILE      41.95  CM
WATER CONTENT AT THE NODES(CC/CC)
.2199E+000.2515E+000.2533E+000.2550E+000.2568E+000.2591E+000.2617E+000.2645E+000.3604E+000.3636E+000.3663E+000.3685E+00
.3703E+000.3714E+000.3722E+000.3726E+000.3728E+000.3729E+000.3729E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.4741E-02   CM
DAY          1      HOUR        16.00
WATER IN PROFILE      41.35  CM
WATER CONTENT AT THE NODES(CC/CC)
.7471E-010.2192E+000.2440E+000.2468E+000.2549E+000.2589E+000.2620E+000.2646E+000.3603E+000.3628E+000.3651E+000.3670E+00
.3686E+000.3699E+000.3708E+000.3715E+000.3719E+000.3721E+000.3721E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.9348E-02   CM
DAY          1      HOUR        24.00
WATER IN PROFILE      41.33  CM
WATER CONTENT AT THE NODES(CC/CC)
.2141E+000.2142E+000.2275E+000.2397E+000.2480E+000.2540E+000.2584E+000.2617E+000.3587E+000.3615E+000.3639E+000.3658E+00
.3674E+000.3687E+000.3697E+000.3704E+000.3709E+000.3711E+000.3711E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1366E-01   CM

STAGE          1    STAGE DAY          1    DAY NO.          1
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LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.24073	90.71114
2	90.00000	0.36634	93.50611

DAILY VALUES (CM)					CUMULATIVE VALUES (CM)				
PE	AE	TRANS	PRECIP	INFILT	PE	AE	TRANS	PRECIP	INFILT
0.700	0.696	0.348	0.000	0.000	0.700	0.696	0.348	0.000	0.000

WATER IN PROFILE 41.33 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1366E-01 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.2127E+00	0.1097E+04	0.3036E-06	0.1115E-01
0.3155E+01	0.2127E+00	0.1095E+04	0.3052E-06	0.1118E-01
0.4845E+01	0.2158E+00	0.9874E+03	0.3920E-06	0.1277E-01
0.7155E+01	0.2243E+00	0.7516E+03	0.7589E-06	0.1811E-01
0.8845E+01	0.2300E+00	0.6286E+03	0.1170E-05	0.2276E-01
0.1115E+02	0.2371E+00	0.5057E+03	0.1981E-05	0.3008E-01
0.1285E+02	0.2415E+00	0.4436E+03	0.2720E-05	0.3558E-01
0.1515E+02	0.2464E+00	0.3845E+03	0.3846E-05	0.4273E-01
0.1685E+02	0.2495E+00	0.3521E+03	0.4760E-05	0.4783E-01
0.1915E+02	0.2530E+00	0.3190E+03	0.6046E-05	0.5428E-01
0.2148E+02	0.2552E+00	0.2999E+03	0.7020E-05	0.5874E-01
0.2552E+02	0.2577E+00	0.2795E+03	0.8323E-05	0.6428E-01
0.2763E+02	0.2593E+00	0.2673E+03	0.9276E-05	0.6807E-01
0.2937E+02	0.2612E+00	0.2537E+03	0.1052E-04	0.7277E-01
0.3063E+02	0.2824E+00	0.1457E+03	0.1637E-01	0.1481E+00
0.3237E+02	0.3383E+00	0.1051E+04	0.3242E-03	0.2828E-01
0.3406E+02	0.3594E+00	0.5278E+03	0.3795E-05	0.6353E-01
0.3694E+02	0.3610E+00	0.5014E+03	0.4263E-05	0.6749E-01
0.3927E+02	0.3621E+00	0.4845E+03	0.4607E-05	0.7027E-01
0.4273E+02	0.3635E+00	0.4644E+03	0.5070E-05	0.7385E-01
0.4527E+02	0.3644E+00	0.4514E+03	0.5406E-05	0.7635E-01
0.4873E+02	0.3655E+00	0.4358E+03	0.5853E-05	0.7957E-01
0.5211E+02	0.3663E+00	0.4258E+03	0.6171E-05	0.8179E-01
0.5789E+02	0.3672E+00	0.4137E+03	0.6587E-05	0.8460E-01
0.6211E+02	0.3678E+00	0.4060E+03	0.6874E-05	0.8650E-01
0.6789E+02	0.3685E+00	0.3968E+03	0.7238E-05	0.8885E-01
0.7211E+02	0.3690E+00	0.3910E+03	0.7482E-05	0.9039E-01
0.7789E+02	0.3696E+00	0.3843E+03	0.7782E-05	0.9225E-01
0.8211E+02	0.3699E+00	0.3801E+03	0.7977E-05	0.9345E-01
0.8789E+02	0.3703E+00	0.3754E+03	0.8207E-05	0.9484E-01
0.9211E+02	0.3706E+00	0.3726E+03	0.8349E-05	0.9569E-01
0.9789E+02	0.3708E+00	0.3695E+03	0.8504E-05	0.9661E-01
0.1021E+03	0.3710E+00	0.3679E+03	0.8591E-05	0.9712E-01
0.1079E+03	0.3711E+00	0.3664E+03	0.8670E-05	0.9758E-01
0.1121E+03	0.3712E+00	0.3659E+03	0.8699E-05	0.9775E-01
0.1179E+03	0.3712E+00	0.3659E+03	0.8699E-05	0.9775E-01

DAY 2 HOUR 8.00

WATER IN PROFILE 41.26 CM

WATER CONTENT AT THE NODES(CC/CC)

.1782E+000,2367E+000,2389E+000,2424E+000,2471E+000,2518E+000,2558E+000,2590E+000,3571E+000,3600E+000,3625E+000,3646E+00

.3662E+000,3676E+000,3686E+000,3693E+000,3698E+000,3700E+000,3700E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.4007E-02 CM

DAY 2 HOUR 16.00

WATER IN PROFILE 40.70 CM

WATER CONTENT AT THE NODES(CC/CC)

.4000E-010.2060E+000.2272E+000.2403E+000.2474E+000.2518E+000.2553E+000.2581E+000.3564E+000.3591E+000.3614E+000.3634E+00

.3651E+000.3665E+000.3675E+000.3683E+000.3687E+000.3690E+000.3690E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.7730E-02 CM

DAY 2 HOUR 24.00

WATER IN PROFILE 40.67 CM

WATER CONTENT AT THE NODES(CC/CC)

.1843E+000.1844E+000.2161E+000.2324E+000.2418E+000.2481E+000.2527E+000.2561E+000.3553E+000.3581E+000.3605E+000.3625E+00

.3641E+000.3654E+000.3665E+000.3672E+000.3677E+000.3680E+000.3680E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1119E-01 CM

STAGE 1 STAGE DAY 2 DAY NO. 2

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.22916	79.49812
2	90.00000	0.36303	90.36657

DAILY VALUES (CM)					CUMULATIVE VALUES (CM)				
PE	AE	TRANS	PRECIP	INFILT	PE	AE	TRANS	PRECIP	INFILT
0.700	0.653	0.348	0.000	0.000	1.400	1.349	0.696	0.000	0.000

WATER IN PROFILE 40.67 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1119E-01 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.1829E+00	0.3216E+04	0.2247E-07	0.2813E-02
0.3155E+01	0.1829E+00	0.3213E+04	0.2252E-07	0.2816E-02
0.4845E+01	0.1900E+00	0.2450E+04	0.4341E-07	0.3986E-02
0.7155E+01	0.2093E+00	0.1227E+04	0.2315E-06	0.9662E-02
0.8845E+01	0.2198E+00	0.8664E+03	0.5378E-06	0.1509E-01
0.1115E+02	0.2291E+00	0.6452E+03	0.1098E-05	0.2201E-01
0.1285E+02	0.2345E+00	0.5467E+03	0.1640E-05	0.2722E-01
0.1515E+02	0.2400E+00	0.4643E+03	0.2436E-05	0.3356E-01
0.1685E+02	0.2433E+00	0.4208E+03	0.3090E-05	0.3806E-01
0.1915E+02	0.2470E+00	0.3784E+03	0.3999E-05	0.4362E-01
0.2148E+02	0.2493E+00	0.3542E+03	0.4691E-05	0.4746E-01
0.2552E+02	0.2519E+00	0.3288E+03	0.5616E-05	0.5220E-01
0.2763E+02	0.2536E+00	0.3136E+03	0.6297E-05	0.5546E-01
0.2937E+02	0.2555E+00	0.2969E+03	0.7194E-05	0.5951E-01
0.3063E+02	0.2772E+00	0.1662E+03	0.1418E-01	0.1251E+00
0.3237E+02	0.3345E+00	0.1198E+04	0.2874E-03	0.2424E-01
0.3406E+02	0.3560E+00	0.5881E+03	0.2971E-05	0.5595E-01
0.3694E+02	0.3576E+00	0.5587E+03	0.3337E-05	0.5943E-01

0.3927E+02	0.3587E+00	0.5398E+03	0.3608E-05	0.6189E-01
0.4273E+02	0.3601E+00	0.5171E+03	0.3975E-05	0.6508E-01
0.4527E+02	0.3610E+00	0.5024E+03	0.4243E-05	0.6733E-01
0.4873E+02	0.3621E+00	0.4846E+03	0.4604E-05	0.7024E-01
0.5211E+02	0.3629E+00	0.4731E+03	0.4862E-05	0.7226E-01
0.5789E+02	0.3638E+00	0.4591E+03	0.5203E-05	0.7485E-01
0.6211E+02	0.3645E+00	0.4502E+03	0.5440E-05	0.7660E-01
0.6789E+02	0.3652E+00	0.4395E+03	0.5743E-05	0.7879E-01
0.7211E+02	0.3657E+00	0.4328E+03	0.5948E-05	0.8024E-01
0.7789E+02	0.3663E+00	0.4249E+03	0.6201E-05	0.8199E-01
0.8211E+02	0.3667E+00	0.4200E+03	0.6367E-05	0.8312E-01
0.8789E+02	0.3671E+00	0.4144E+03	0.6563E-05	0.8444E-01
0.9211E+02	0.3674E+00	0.4110E+03	0.6685E-05	0.8525E-01
0.9789E+02	0.3677E+00	0.4074E+03	0.6819E-05	0.8614E-01
0.1021E+03	0.3678E+00	0.4055E+03	0.6893E-05	0.8662E-01
0.1079E+03	0.3680E+00	0.4037E+03	0.6961E-05	0.8707E-01
0.1121E+03	0.3680E+00	0.4031E+03	0.6986E-05	0.8723E-01
0.1179E+03	0.3680E+00	0.4031E+03	0.6986E-05	0.8723E-01

DAY 3 HOUR 8.00

WATER IN PROFILE 40.60 CM

WATER CONTENT AT THE NODES(CC/CC)

.1448E+000.2107E+000.2255E+000.2332E+000.2395E+000.2456E+000.2502E+000.2538E+000.3540E+000.3569E+000.3594E+000.3614E+00

.3631E+000.3645E+000.3655E+000.3662E+000.3667E+000.3670E+000.3670E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3224E-02 CM

DAY 3 HOUR 16.00

WATER IN PROFILE 40.16 CM

WATER CONTENT AT THE NODES(CC/CC)

.4000E-010.1923E+000.2139E+000.2310E+000.2397E+000.2452E+000.2492E+000.2525E+000.3532E+000.3559E+000.3583E+000.3604E+00

.3621E+000.3635E+000.3645E+000.3653E+000.3658E+000.3660E+000.3660E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.6236E-02 CM

DAY 3 HOUR 24.00

WATER IN PROFILE 40.14 CM

WATER CONTENT AT THE NODES(CC/CC)

.1659E+000.1659E+000.2088E+000.2260E+000.2358E+000.2424E+000.2472E+000.2508E+000.3522E+000.3551E+000.3575E+000.3595E+00

.3612E+000.3625E+000.3636E+000.3643E+000.3648E+000.3651E+000.3651E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.9054E-02 CM

STAGE 1 STAGE DAY 3 DAY NO. 3

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.22067	71.23657
2	90.00000	0.36006	87.53796

DAILY VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
0.700	0.531	0.348	0.000	0.000

CUMULATIVE VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
2.100	1.880	1.044	0.000	0.000

WATER IN PROFILE 40.14 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.9054E-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.1648E+00	0.6747E+04	0.3735E-08	0.1089E-02
0.3155E+01	0.1648E+00	0.6744E+04	0.3739E-08	0.1089E-02
0.4945E+01	0.1741E+00	0.4555E+04	0.9672E-08	0.1801E-02
0.7155E+01	0.1996E+00	0.1721E+04	0.1021E-06	0.6265E-02
0.8945E+01	0.2126E+00	0.1100E+04	0.3015E-06	0.1111E-01
0.1115E+02	0.2224E+00	0.7969E+03	0.6586E-06	0.1680E-01
0.1285E+02	0.2281E+00	0.6656E+03	0.1019E-05	0.2116E-01
0.1515E+02	0.2338E+00	0.5582E+03	0.1560E-05	0.2651E-01
0.1685E+02	0.2373E+00	0.5022E+03	0.2014E-05	0.3035E-01
0.1915E+02	0.2412E+00	0.4480E+03	0.2656E-05	0.3513E-01
0.2148E+02	0.2436E+00	0.4173E+03	0.3154E-05	0.3847E-01
0.2552E+02	0.2463E+00	0.3852E+03	0.3828E-05	0.4262E-01
0.2763E+02	0.2481E+00	0.3660E+03	0.4332E-05	0.4550E-01
0.2937E+02	0.2502E+00	0.3449E+03	0.5005E-05	0.4911E-01
0.3063E+02	0.2724E+00	0.1884E+03	0.1237E-01	0.1066E+00
0.3237E+02	0.3309E+00	0.1354E+04	0.2570E-03	0.2099E-01
0.3406E+02	0.3529E+00	0.6499E+03	0.2369E-05	0.4975E-01
0.3694E+02	0.3545E+00	0.6167E+03	0.2669E-05	0.5292E-01
0.3927E+02	0.3556E+00	0.5952E+03	0.2891E-05	0.5516E-01
0.4273E+02	0.3570E+00	0.5695E+03	0.3195E-05	0.5810E-01
0.4527E+02	0.3580E+00	0.5528E+03	0.3417E-05	0.6017E-01
0.4873E+02	0.3591E+00	0.5327E+03	0.3718E-05	0.6286E-01
0.5211E+02	0.3599E+00	0.5196E+03	0.3933E-05	0.6473E-01
0.5789E+02	0.3609E+00	0.5038E+03	0.4218E-05	0.6712E-01
0.6211E+02	0.3615E+00	0.4936E+03	0.4416E-05	0.6874E-01
0.6789E+02	0.3623E+00	0.4817E+03	0.4669E-05	0.7075E-01
0.7211E+02	0.3628E+00	0.4741E+03	0.4840E-05	0.7209E-01
0.7789E+02	0.3634E+00	0.4652E+03	0.5050E-05	0.7370E-01
0.8211E+02	0.3638E+00	0.4597E+03	0.5188E-05	0.7474E-01
0.8789E+02	0.3642E+00	0.4534E+03	0.5352E-05	0.7595E-01
0.9211E+02	0.3645E+00	0.4497E+03	0.5453E-05	0.7670E-01
0.9789E+02	0.3648E+00	0.4457E+03	0.5564E-05	0.7751E-01
0.1021E+03	0.3649E+00	0.4435E+03	0.5626E-05	0.7795E-01
0.1079E+03	0.3651E+00	0.4416E+03	0.5683E-05	0.7836E-01
0.1121E+03	0.3651E+00	0.4409E+03	0.5703E-05	0.7851E-01
0.1179E+03	0.3651E+00	0.4409E+03	0.5703E-05	0.7851E-01

DAY 4 HOUR 8.00

WATER IN PROFILE 40.08 CM

WATER CONTENT AT THE NODES(CC/CC)

.5835E-010.2134E+000.2269E+000.2255E+000.2341E+000.2405E+000.2453E+000.2491E+000.3512E+000.3541E+000.3565E+000.3586E+00

.3603E+000.3616E+000.3627E+000.3634E+000.3639E+000.3642E+000.3642E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2641E-02 CM

DAY 4 HOUR 16.00

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WATER IN PROFILE      39.70  CM
WATER CONTENT AT THE NODES(CC/CC)
.4000E-010,1787E+000,2029E+000,2238E+000,2337E+000,2399E+000,2443E+000,2478E+000,3504E+000,3532E+000,3556E+000,3577E+00
.3594E+000,3608E+000,3619E+000,3626E+000,3631E+000,3633E+000,3633E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.5121E-02   CM
DAY          4      HOUR        24.00
WATER IN PROFILE      39.68  CM
WATER CONTENT AT THE NODES(CC/CC)
.1503E+000,1503E+000,2027E+000,2205E+000,2308E+000,2377E+000,2427E+000,2465E+000,3496E+000,3525E+000,3548E+000,3569E+00
.3586E+000,3599E+000,3610E+000,3617E+000,3622E+000,3625E+000,3625E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.7454E-02   CM

STAGE          1     STAGE DAY          4     DAY NO.          4

  LAYER    THICKNESS(CM)   AV MOIST(CC/CC)   WATER CONTENT(PERCENT AVAIL)
    1          30.00000          0.21349          64.26706
    2          90.00000          0.35740          85.01205

              DAILY VALUES (CM)                    CUMULATIVE VALUES (CM)

    PE      AE      TRANS   PRECIP   INFILT      PE      AE      TRANS   PRECIP   INFILT
  0.700   0.461     0.348    0.000    0.000    2.800   2.341    1.392    0.000    0.000

WATER IN PROFILE      39.68  CM
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.7454E-02   CM

        DEPTH(CM)        WATER CONTENT(CC/CC)   SUCTION HEAD(CM)   CONDUCTIVITY(CM/MIN)   DIFFUSIVITY(CM*CM/MIN)
        0.8453E+00           0.1495E+00           0.1352E+05           0.6936E-09           0.4469E-03
        0.3155E+01           0.1495E+00           0.1352E+05           0.6940E-09           0.4470E-03
        0.4845E+01           0.1607E+00           0.8065E+04           0.2425E-08           0.8664E-03
        0.7155E+01           0.1914E+00           0.2321E+04           0.4950E-07           0.4273E-02
        0.8845E+01           0.2064E+00           0.1355E+04           0.1820E-06           0.8507E-02
        0.1115E+02           0.2167E+00           0.9584E+03           0.4213E-06           0.1326E-01
        0.1285E+02           0.2227E+00           0.7902E+03           0.6722E-06           0.1698E-01
        0.1515E+02           0.2287E+00           0.6545E+03           0.1061E-05           0.2162E-01
        0.1685E+02           0.2323E+00           0.5946E+03           0.1394E-05           0.2498E-01
        0.1915E+02           0.2363E+00           0.5176E+03           0.1873E-05           0.2920E-01
        0.2148E+02           0.2389E+00           0.4799E+03           0.2248E-05           0.3216E-01
        0.2552E+02           0.2417E+00           0.4408E+03           0.2763E-05           0.3587E-01
        0.2763E+02           0.2436E+00           0.4175E+03           0.3151E-05           0.3845E-01
        0.2937E+02           0.2458E+00           0.3918E+03           0.3675E-05           0.4171E-01
        0.3063E+02           0.2684E+00           0.2095E+03           0.1100E-01           0.9302E-01
        0.3237E+02           0.3279E+00           0.1503E+04           0.2337E-03           0.1858E-01
        0.3406E+02           0.3503E+00           0.7077E+03           0.1954E-05           0.4501E-01
        0.3694E+02           0.3519E+00           0.6713E+03           0.2202E-05           0.4789E-01
        0.3927E+02           0.3530E+00           0.6478E+03           0.2387E-05           0.4994E-01
        0.4273E+02           0.3544E+00           0.6197E+03           0.2640E-05           0.5262E-01
        0.4527E+02           0.3553E+00           0.6014E+03           0.2825E-05           0.5450E-01
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0.4873E+02	0.3565E+00	0.5792E+03	0.3075E-05	0.5696E-01
0.5211E+02	0.3573E+00	0.5649E+03	0.3255E-05	0.5867E-01
0.5789E+02	0.3583E+00	0.5476E+03	0.3493E-05	0.6085E-01
0.6211E+02	0.3589E+00	0.5365E+03	0.3658E-05	0.6233E-01
0.6789E+02	0.3597E+00	0.5233E+03	0.3869E-05	0.6418E-01
0.7211E+02	0.3602E+00	0.5150E+03	0.4012E-05	0.6540E-01
0.7789E+02	0.3608E+00	0.5053E+03	0.4188E-05	0.6687E-01
0.8211E+02	0.3612E+00	0.4983E+03	0.4304E-05	0.6782E-01
0.8789E+02	0.3616E+00	0.4924E+03	0.4440E-05	0.6893E-01
0.9211E+02	0.3619E+00	0.4883E+03	0.4525E-05	0.6961E-01
0.9789E+02	0.3622E+00	0.4840E+03	0.4618E-05	0.7035E-01
0.1021E+03	0.3623E+00	0.4816E+03	0.4670E-05	0.7076E-01
0.1079E+03	0.3625E+00	0.4795E+03	0.4717E-05	0.7113E-01
0.1121E+03	0.3625E+00	0.4787E+03	0.4734E-05	0.7127E-01
0.1179E+03	0.3625E+00	0.4787E+03	0.4734E-05	0.7127E-01

DAY 5 HOUR 8.00

WATER IN PROFILE 39.63 CM

WATER CONTENT AT THE NODES(CC/CC)

.4350E-010.2058E+000.2133E+000.2206E+000.2297E+000.2362E+000.2412E+000.2450E+000.3488E+000.3516E+000.3540E+000.3561E+00

.3578E+000.3591E+000.3601E+000.3609E+000.3614E+000.3616E+000.3616E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2199E-02 CM

DAY 5 HOUR 16.00

WATER IN PROFILE 39.28 CM

WATER CONTENT AT THE NODES(CC/CC)

.4031E-010.1652E+000.1932E+000.2182E+000.2287E+000.2353E+000.2401E+000.2439E+000.3481E+000.3509E+000.3532E+000.3553E+00

.3570E+000.3583E+000.3594E+000.3601E+000.3606E+000.3608E+000.3608E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.4275E-02 CM

DAY 5 HOUR 24.00

WATER IN PROFILE 39.27 CM

WATER CONTENT AT THE NODES(CC/CC)

.1368E+000.1368E+000.1971E+000.2157E+000.2264E+000.2336E+000.2388E+000.2427E+000.3474E+000.3501E+000.3525E+000.3545E+00

.3562E+000.3576E+000.3586E+000.3593E+000.3598E+000.3601E+000.3601E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.6238E-02 CM

STAGE 1 STAGE DAY 5 DAY NO. 5

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.20723	58.18648
2	90.00000	0.35501	82.74244

DAILY VALUES (CM) CUMULATIVE VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT	PE	AE	TRANS	PRECIP	INFILT
0.700	0.409	0.348	0.000	0.000	3.500	2.750	1.740	0.000	0.000

WATER IN PROFILE 39.27 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.623BE-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.1361E+00	0.2629E+05	0.1386E-09	0.1907E-03
0.3155E+01	0.1361E+00	0.2629E+05	0.1387E-09	0.1907E-03
0.4845E+01	0.1490E+00	0.1383E+05	0.6569E-09	0.4342E-03
0.7155E+01	0.1841E+00	0.3066E+04	0.2523E-07	0.2991E-02
0.8845E+01	0.2009E+00	0.1646E+04	0.1137E-06	0.6634E-02
0.1115E+02	0.2117E+00	0.1134E+04	0.2605E-06	0.1069E-01
0.1285E+02	0.2179E+00	0.9217E+03	0.4630E-06	0.1394E-01
0.1515E+02	0.2242E+00	0.7534E+03	0.7543E-06	0.1805E-01
0.1685E+02	0.2280E+00	0.6682E+03	0.1009E-05	0.2105E-01
0.1915E+02	0.2322E+00	0.5874E+03	0.1378E-05	0.2483E-01
0.2148E+02	0.2348E+00	0.5424E+03	0.1671E-05	0.2749E-01
0.2552E+02	0.2378E+00	0.4960E+03	0.2076E-05	0.3084E-01
0.2763E+02	0.2397E+00	0.4685E+03	0.2384E-05	0.3317E-01
0.2937E+02	0.2419E+00	0.4382E+03	0.2802E-05	0.3613E-01
0.3063E+02	0.2449E+00	0.2299E+03	0.9926E-02	0.8256E-01
0.3237E+02	0.3253E+00	0.1646E+04	0.2151E-03	0.1669E-01
0.3406E+02	0.3480E+00	0.7625E+03	0.1650E-05	0.4123E-01
0.3694E+02	0.3496E+00	0.7235E+03	0.1859E-05	0.4385E-01
0.3927E+02	0.3507E+00	0.6983E+03	0.2014E-05	0.4572E-01
0.4273E+02	0.3521E+00	0.6680E+03	0.2227E-05	0.4817E-01
0.4527E+02	0.3530E+00	0.6483E+03	0.2383E-05	0.4989E-01
0.4873E+02	0.3541E+00	0.6245E+03	0.2594E-05	0.5214E-01
0.5211E+02	0.3549E+00	0.6090E+03	0.2745E-05	0.5370E-01
0.5489E+02	0.3559E+00	0.5903E+03	0.2946E-05	0.5570E-01
0.5211E+02	0.3565E+00	0.5784E+03	0.3085E-05	0.5706E-01
0.6789E+02	0.3573E+00	0.5642E+03	0.3263E-05	0.5874E-01
0.7211E+02	0.3578E+00	0.5553E+03	0.3384E-05	0.5986E-01
0.7789E+02	0.3584E+00	0.5448E+03	0.3532E-05	0.6121E-01
0.8211E+02	0.3588E+00	0.5383E+03	0.3630E-05	0.6208E-01
0.8789E+02	0.3592E+00	0.5309E+03	0.3745E-05	0.6310E-01
0.9211E+02	0.3595E+00	0.5265E+03	0.3816E-05	0.6372E-01
0.9789E+02	0.3598E+00	0.5218E+03	0.3894E-05	0.6439E-01
0.1021E+03	0.3599E+00	0.5193E+03	0.3938E-05	0.6477E-01
0.1079E+03	0.3601E+00	0.5170E+03	0.3978E-05	0.6511E-01
0.1121E+03	0.3601E+00	0.5161E+03	0.3992E-05	0.6523E-01
0.1179E+03	0.3601E+00	0.5161E+03	0.3992E-05	0.6523E-01

DAY 6 HOUR 8.00

WATER IN PROFILE 39.23 CM

WATER CONTENT AT THE NODES(CC/CC)

.4264E-010,1880E+000,2034E+000,2167E+000,2258E+000,2324E+000,2375E+000,2414E+000,3466E+000,3494E+000,3518E+000,3538E+00

,3555E+000,3568E+000,3578E+000,3586E+000,3591E+000,3593E+000,3593E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1859E-02 CM

DAY 6 HOUR 16.00

WATER IN PROFILE 38.91 CM

WATER CONTENT AT THE NODES(CC/CC)

.4000E-010,1552E+000,1827E+000,2116E+000,2243E+000,2316E+000,2366E+000,2405E+000,3460E+000,3487E+000,3511E+000,3531E+00

.3548E+000,3561E+000,3571E+000,3579E+000,3584E+000,3586E+000,3586E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.3623E-02 CM

DAY 6 HOUR 24.00

WATER IN PROFILE 38.90 CM

WATER CONTENT AT THE NODES(CC/CC)

.1252E+000,1253E+000,1903E+000,2106E+000,2223E+000,2299E+000,2353E+000,2394E+000,3454E+000,3481E+000,3504E+000,3524E+00

.3541E+000,3554E+000,3564E+000,3572E+000,3577E+000,3579E+000,3579E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.5299E-02 CM

STAGE 1 STAGE DAY 6 DAY NO. 6

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.20136	52.48890
2	90.00000	0.35286	80.69552

DAILY VALUES (CM)					CUMULATIVE VALUES (CM)				
PE	AE	TRANS	PRECIP	INFILT	PE	AE	TRANS	PRECIP	INFILT
0.700	0.375	0.348	0.000	0.000	4.200	3.125	2.088	0.000	0.000

WATER IN PROFILE 38.90 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.5299E-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.1248E+00	0.4872E+05	0.3113E-10	0.8652E-04
0.3155E+01	0.1248E+00	0.4872E+05	0.3114E-10	0.8653E-04
0.4845E+01	0.1386E+00	0.2318E+05	0.1081E-09	0.2241E-03
0.7155E+01	0.1761E+00	0.4211E+04	0.1169E-07	0.1991E-02
0.8845E+01	0.1942E+00	0.2097E+04	0.6324E-07	0.4864E-02
0.1115E+02	0.2061E+00	0.1370E+04	0.1775E-06	0.8395E-02
0.1285E+02	0.2130E+00	0.1084E+04	0.3126E-06	0.1133E-01
0.1515E+02	0.2148E+00	0.8662E+03	0.5381E-06	0.1510E-01
0.1685E+02	0.2240E+00	0.7591E+03	0.7408E-06	0.1788E-01
0.1915E+02	0.2284E+00	0.6604E+03	0.1038E-05	0.2137E-01
0.2148E+02	0.2311E+00	0.6064E+03	0.1276E-05	0.2384E-01
0.2552E+02	0.2342E+00	0.5514E+03	0.1607E-05	0.2692E-01
0.2763E+02	0.2362E+00	0.5191E+03	0.1859E-05	0.2909E-01
0.2937E+02	0.2386E+00	0.4846E+03	0.2202E-05	0.3181E-01
0.3063E+02	0.2619E+00	0.2496E+03	0.9060E-02	0.7430E-01
0.3237E+02	0.3230E+00	0.1743E+04	0.1999E-03	0.1519E-01
0.3406E+02	0.3460E+00	0.8145E+03	0.1422E-05	0.3815E-01
0.3569E+02	0.3476E+00	0.7732E+03	0.1599E-05	0.4056E-01
0.3927E+02	0.3486E+00	0.7466E+03	0.1732E-05	0.4227E-01
0.4273E+02	0.3500E+00	0.7145E+03	0.1913E-05	0.4451E-01
0.4527E+02	0.3509E+00	0.6936E+03	0.2045E-05	0.4609E-01
0.4873E+02	0.3521E+00	0.6683E+03	0.2225E-05	0.4815E-01
0.5211E+02	0.3528E+00	0.6518E+03	0.2354E-05	0.4958E-01
0.5789E+02	0.3538E+00	0.6320E+03	0.2524E-05	0.5141E-01

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0.6211E+02   0.3544E+00   0.6193E+03   0.2643E-05   0.5265E-01
0.6789E+02   0.3552E+00   0.5043E+03   0.2794E-05   0.5420E-01
0.7211E+02   0.3557E+00   0.5947E+03   0.2897E-05   0.5522E-01
0.7789E+02   0.3563E+00   0.5936E+03   0.3023E-05   0.5646E-01
0.8211E+02   0.3566E+00   0.5767E+03   0.3106E-05   0.5726E-01
0.8789E+02   0.3571E+00   0.5688E+03   0.3204E-05   0.5819E-01
0.9211E+02   0.3573E+00   0.5641E+03   0.3265E-05   0.5876E-01
0.9789E+02   0.3576E+00   0.5591E+03   0.3331E-05   0.5938E-01
0.1021E+03   0.3578E+00   0.5564E+03   0.3369E-05   0.5972E-01
0.1079E+03   0.3579E+00   0.5539E+03   0.3402E-05   0.6003E-01
0.1121E+03   0.3579E+00   0.5530E+03   0.3415E-05   0.6015E-01
0.1179E+03   0.3579E+00   0.5530E+03   0.3415E-05   0.6015E-01

DAY          7      HOUR          8.00
WATER IN PROFILE      38.85  CM
WATER CONTENT AT THE NODES(CC/CC)
.5000E-010,.1644E+000,.1947E+000,.2111E+000,.2218E+000,.2289E+000,.2342E+000,.2382E+000,.3447E+000,.3474E+000,.3498E+000,.3518E+00
.3534E+000,.3547E+000,.3558E+000,.3565E+000,.3570E+000,.3572E+000,.3572E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.1594E-02   CM
DAY          7      HOUR         16.00
WATER IN PROFILE      38.54  CM
WATER CONTENT AT THE NODES(CC/CC)
.4048E-010,.1617E+000,.1645E+000,.1967E+000,.2176E+000,.2274E+000,.2332E+000,.2373E+000,.3441E+000,.3468E+000,.3491E+000,.3511E+00
.3528E+000,.3541E+000,.3551E+000,.3558E+000,.3563E+000,.3564E+000,.3566E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.3113E-02   CM
DAY          7      HOUR         24.00
WATER IN PROFILE      38.54  CM
WATER CONTENT AT THE NODES(CC/CC)
.1269E+000,.1269E+000,.1728E+000,.2018E+000,.2164E+000,.2254E+000,.2315E+000,.2360E+000,.3434E+000,.3462E+000,.3485E+000,.3505E+00
.3521E+000,.3535E+000,.3545E+000,.3552E+000,.3557E+000,.3559E+000,.3559E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.4562E-02   CM

STAGE          1     STAGE DAY          7     DAY NO.          7

  LAYER    THICKNESS(CM)   AV MOIST(CC/CC)   WATER CONTENT(PERCENT AVAIL)
    1         30.00000          0.19557          46.87182
    2         90.00000          0.35091          78.84559

              DAILY VALUES (CM)                          CUMULATIVE VALUES (CM)

    PE        AE      TRANS   PRECIP   INFILT     PE        AE      TRANS   PRECIP   INFILT
  0.700     0.353     0.342    0.000    0.000    4.900     3.479     2.430    0.000    0.000
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WATER IN PROFILE 38.54 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.4562E-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.9453E+00	0.1265E+00	0.4439E+05	0.3902E-10	0.9750E-04
0.3155E+01	0.1265E+00	0.4439E+05	0.3902E-10	0.9751E-04
0.4845E+01	0.1359E+00	0.2664E+05	0.1343E-09	0.1875E-03
0.7155E+01	0.1615E+00	0.7770E+04	0.2653E-08	0.9087E-03
0.8845E+01	0.1774E+00	0.3990E+04	0.1333E-07	0.2134E-02
0.1115E+02	0.1950E+00	0.2032E+04	0.6829E-07	0.5065E-02
0.1285E+02	0.2046E+00	0.1443E+04	0.1565E-06	0.7854E-02
0.1515E+02	0.2133E+00	0.1076E+04	0.3185E-06	0.1144E-01
0.1685E+02	0.2183E+00	0.9099E+03	0.4775E-06	0.1417E-01
0.1915E+02	0.2236E+00	0.7483E+03	0.7194E-06	0.1760E-01
0.2148E+02	0.2268E+00	0.6938E+03	0.9210E-06	0.2006E-01
0.2552E+02	0.2304E+00	0.6209E+03	0.1205E-05	0.2313E-01
0.2763E+02	0.2326E+00	0.5794E+03	0.1425E-05	0.2527E-01
0.2937E+02	0.2352E+00	0.5356E+03	0.1724E-05	0.2794E-01
0.3063E+02	0.2588E+00	0.2709E+03	0.8267E-02	0.6690E-01
0.3237E+02	0.3208E+00	0.1929E+04	0.1862E-03	0.1385E-01
0.3406E+02	0.3441E+00	0.8690E+03	0.1231E-05	0.3540E-01
0.3694E+02	0.3457E+00	0.8231E+03	0.1308E-05	0.3769E-01
0.3927E+02	0.3468E+00	0.7943E+03	0.1505E-05	0.3930E-01
0.4273E+02	0.3481E+00	0.7599E+03	0.1664E-05	0.4140E-01
0.4529E+02	0.3490E+00	0.7375E+03	0.1780E-05	0.4288E-01
0.4873E+02	0.3502E+00	0.7106E+03	0.1936E-05	0.4479E-01
0.5211E+02	0.3509E+00	0.6931E+03	0.2048E-05	0.4612E-01
0.5789E+02	0.3519E+00	0.6721E+03	0.2196E-05	0.4782E-01
0.6211E+02	0.3525E+00	0.6587E+03	0.2299E-05	0.4897E-01
0.6789E+02	0.3533E+00	0.6427E+03	0.2430E-05	0.5041E-01
0.7211E+02	0.3537E+00	0.6326E+03	0.2519E-05	0.5135E-01
0.7789E+02	0.3543E+00	0.6209E+03	0.2628E-05	0.5250E-01
0.8211E+02	0.3547E+00	0.6135E+03	0.2700E-05	0.5323E-01
0.8789E+02	0.3551E+00	0.6052E+03	0.2784E-05	0.5409E-01
0.9211E+02	0.3554E+00	0.6003E+03	0.2837E-05	0.5462E-01
0.9789E+02	0.3557E+00	0.5949E+03	0.2894E-05	0.5520E-01
0.1021E+03	0.3558E+00	0.5921E+03	0.2926E-05	0.5551E-01
0.1079E+03	0.3559E+00	0.5895E+03	0.2956E-05	0.5580E-01
0.1121E+03	0.3560E+00	0.5885E+03	0.2966E-05	0.5591E-01
0.1179E+03	0.3560E+00	0.5885E+03	0.2966E-05	0.5591E-01

DAY 8 HOUR 8.00

WATER IN PROFILE 38.50 CM

WATER CONTENT AT THE NODES(CC/CC)

.5000E-010.1632E+000.1813E+000.2006E+000.2165E+000.2245E+000.2304E+000.2348E+000.3427E+000.3455E+000.3479E+000.3499E+00

.3515E+000.3528E+000.3538E+000.3546E+000.3551E+000.3553E+000.3553E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1384E-02 CM

DAY 8 HOUR 16.00

WATER IN PROFILE 38.19 CM

WATER CONTENT AT THE NODES(CC/CC)

.4023E-010.1622E+000.1653E+000.1814E+000.2048E+000.2207E+000.2286E+000.2338E+000.3421E+000.3449E+000.3472E+000.3492E+00

.3509E+000.3522E+000.3532E+000.3540E+000.3544E+000.3547E+000.3547E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2707E-02 CM

DAY 8 HOUR 24.00

WATER IN PROFILE 38.19 CM

WATER CONTENT AT THE NODES(CC/CC)

.1281E+000.1281E+000.1624E+000.1910E+000.2083E+000.2193E+000.2268E+000.2320E+000.3411E+000.3441E+000.3465E+000.3486E+00

.3503E+000.3516E+000.3526E+000.3534E+000.3538E+000.3541E+000.3541E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3974E-02 CM

STAGE 1 STAGE DAY 8 DAY NO. 8

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.18981	41.27493
2	90.00000	0.34899	77.01537

DAILY VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
0.700	0.353	0.342	0.000	0.000

CUMULATIVE VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
5.600	3.831	2.772	0.000	0.000

WATER IN PROFILE 38.19 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3974E-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.1276E+00	0.4167E+05	0.4548E-10	0.1057E-03
0.3155E+01	0.1276E+00	0.4166E+05	0.4549E-10	0.1057E-03
0.4845E+01	0.1348E+00	0.2821E+05	0.1170E-09	0.1743E-03
0.7155E+01	0.1544E+00	0.1077E+05	0.1219E-08	0.6021E-03
0.8845E+01	0.1676E+00	0.5972E+04	0.5019E-08	0.1273E-02
0.1115E+02	0.1841E+00	0.3064E+04	0.2526E-07	0.2993E-02
0.1285E+02	0.1939E+00	0.2117E+04	0.6184E-07	0.4806E-02
0.1515E+02	0.2043E+00	0.1462E+04	0.1515E-06	0.7721E-02
0.1685E+02	0.2104E+00	0.1182E+04	0.2533E-06	0.1013E-01
0.1915E+02	0.2170E+00	0.9511E+03	0.4291E-06	0.1339E-01
0.2148E+02	0.2210E+00	0.8355E+03	0.5873E-06	0.1581E-01
0.2552E+02	0.2253E+00	0.7270E+03	0.8226E-06	0.1890E-01
0.2763E+02	0.2280E+00	0.6677E+03	0.1011E-05	0.2107E-01
0.2937E+02	0.2311E+00	0.6078E+03	0.1269E-05	0.2377E-01
0.3063E+02	0.2552E+00	0.2995E+03	0.7382E-02	0.5884E-01
0.3237E+02	0.3182E+00	0.2119E+04	0.1712E-03	0.1240E-01
0.3406E+02	0.3418E+00	0.9352E+03	0.1040E-05	0.3244E-01
0.3694E+02	0.3435E+00	0.8831E+03	0.1184E-05	0.3470E-01
0.3927E+02	0.3447E+00	0.8501E+03	0.1291E-05	0.3629E-01
0.4273E+02	0.3461E+00	0.8111E+03	0.1435E-05	0.3834E-01
0.4527E+02	0.3471E+00	0.7861E+03	0.1541E-05	0.3978E-01
0.4873E+02	0.3483E+00	0.7563E+03	0.1682E-05	0.4163E-01
0.5211E+02	0.3490E+00	0.7371E+03	0.1782E-05	0.4291E-01
0.5789E+02	0.3500E+00	0.7142E+03	0.1914E-05	0.4453E-01
0.6211E+02	0.3506E+00	0.6996E+03	0.2006E-05	0.4563E-01
0.6789E+02	0.3514E+00	0.6823E+03	0.2122E-05	0.4698E-01
0.7211E+02	0.3519E+00	0.6715E+03	0.2201E-05	0.4788E-01
0.7789E+02	0.3525E+00	0.6588E+03	0.2298E-05	0.4896E-01

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0.8211E+02    0.3529E+00    0.6510E+03    0.2361E-05    0.4965E-01
0.8789E+02    0.3533E+00    0.6421E+03    0.2435E-05    0.5046E-01
0.9211E+02    0.3535E+00    0.6364E+03    0.2481E-05    0.5095E-01
0.9789E+02    0.3538E+00    0.6311E+03    0.2532E-05    0.5149E-01
0.1021E+03    0.3540E+00    0.6281E+03    0.2560E-05    0.5179E-01
0.1079E+03    0.3541E+00    0.6253E+03    0.2586E-05    0.5206E-01
0.1121E+03    0.3542E+00    0.6243E+03    0.2596E-05    0.5215E-01
0.1179E+03    0.3542E+00    0.6243E+03    0.2596E-05    0.5216E-01

DAY          9      HOUR         8.00
WATER IN PROFILE      38.14  CM
WATER CONTENT AT THE NODES(CC/CC)
.5000E-010.1632E+000.1711E+000.1909E+000.2081E+000.2191E+000.2259E+000.2309E+000.3404E+000.3434E+000.3458E+000.3479E+00
.3497E+000.3510E+000.3520E+000.3528E+000.3533E+000.3535E+000.3535E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1213E-02   CM
DAY          9      HOUR        16.00
WATER IN PROFILE      37.84  CM
WATER CONTENT AT THE NODES(CC/CC)
.4000E-010.1607E+000.1629E+000.1789E+000.1948E+000.2106E+000.2217E+000.2285E+000.3392E+000.3425E+000.3452E+000.3473E+00
.3490E+000.3504E+000.3514E+000.3522E+000.3527E+000.3529E+000.3529E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2376E-02   CM
DAY          9      HOUR        24.00
WATER IN PROFILE      37.84  CM
WATER CONTENT AT THE NODES(CC/CC)
.1265E+000.1265E+000.1586E+000.1829E+000.2002E+000.2122E+000.2209E+000.2271E+000.3382E+000.3416E+000.3443E+000.3466E+00
.3484E+000.3498E+000.3509E+000.3516E+000.3521E+000.3524E+000.3524E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3491E-02   CM

STAGE          1    STAGE DAY          9    DAY NO.          9
  LAYER   THICKNESS(CM)  AV MOIST(CC/CC)  WATER CONTENT(PERCENT AVAIL)
    1        30.00000         0.18432          35.94328
    2        90.00000         0.34701          75.13580
             DAILY VALUES (CM)                    CUMULATIVE VALUES (CM)
   PE      AE      TRANS  PRECIP  INFILT     PE      AE      TRANS  PRECIP  INFILT
 0.700   0.350   0.340   0.000   0.000    6.300   4.181   3.117   0.000   0.000
WATER IN PROFILE      37.84  CM
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3491E-02   CM
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DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.1261E+00	0.4545E+05	0.3684E-10	0.9458E-04
0.3155E+01	0.1261E+00	0.4545E+05	0.3684E-10	0.9459E-04
0.4845E+01	0.1329E+00	0.3125E+05	0.9126E-10	0.1528E-03
0.7155E+01	0.1515E+00	0.1229E+05	0.8736E-09	0.5049E-03
0.8845E+01	0.1633E+00	0.7182E+04	0.3211E-08	0.1005E-02
0.1115E+02	0.1772E+00	0.4023E+04	0.1306E-07	0.2112E-02
0.1285E+02	0.1860E+00	0.2852E+04	0.3006E-07	0.3281E-02
0.1515E+02	0.1961E+00	0.1955E+04	0.7493E-07	0.5320E-02
0.1685E+02	0.2024E+00	0.1561E+04	0.1293E-06	0.7099E-02
0.1915E+02	0.2095E+00	0.1222E+04	0.2341E-06	0.9719E-02
0.2148E+02	0.2139E+00	0.1051E+04	0.3366E-06	0.1178E-01
0.2552E+02	0.2190E+00	0.8891E+03	0.5052E-06	0.1460E-01
0.2763E+02	0.2222E+00	0.9021E+03	0.6483E-06	0.1666E-01
0.2937E+02	0.2259E+00	0.7148E+03	0.8568E-06	0.1931E-01
0.3063E+02	0.2507E+00	0.3403E+03	0.6383E-02	0.4995E-01
0.3237E+02	0.3148E+00	0.2388E+04	0.1539E-03	0.1078E-01
0.3406E+02	0.3390E+00	0.1027E+04	0.8417E-06	0.2906E-01
0.3694E+02	0.3410E+00	0.9624E+03	0.9747E-06	0.3136E-01
0.3927E+02	0.3423E+00	0.9219E+03	0.1074E-05	0.3299E-01
0.4273E+02	0.3438E+00	0.8746E+03	0.1210E-05	0.3509E-01
0.4527E+02	0.3449E+00	0.8446E+03	0.1309E-05	0.3656E-01
0.4873E+02	0.3462E+00	0.8093E+03	0.1443E-05	0.3844E-01
0.5211E+02	0.3470E+00	0.7868E+03	0.1538E-05	0.3974E-01
0.5789E+02	0.3481E+00	0.7603E+03	0.1661E-05	0.4137E-01
0.6211E+02	0.3488E+00	0.7436E+03	0.1747E-05	0.4246E-01
0.6789E+02	0.3496E+00	0.7242E+03	0.1855E-05	0.4381E-01
0.7211E+02	0.3501E+00	0.7120E+03	0.1927E-05	0.4469E-01
0.7789E+02	0.3507E+00	0.6981E+03	0.2016E-05	0.4574E-01
0.8211E+02	0.3511E+00	0.6894E+03	0.2074E-05	0.4642E-01
0.8789E+02	0.3515E+00	0.6797E+03	0.2141E-05	0.4720E-01
0.9211E+02	0.3518E+00	0.6739E+03	0.2183E-05	0.4768E-01
0.9789E+02	0.3521E+00	0.6677E+03	0.2229E-05	0.4820E-01
0.1021E+03	0.3522E+00	0.6643E+03	0.2255E-05	0.4848E-01
0.1079E+03	0.3524E+00	0.6613E+03	0.2278E-05	0.4874E-01
0.1121E+03	0.3524E+00	0.6602E+03	0.2287E-05	0.4884E-01
0.1179E+03	0.3524E+00	0.6602E+03		

DAY 10 HOUR 8.00

WATER IN PROFILE 37.79 CM

WATER CONTENT AT THE NODES(CC/CC)

.5000E-010.1609E+000.1662E+000.1839E+000.1981E+000.2117E+000.2206E+000.2264E+000.3377E+000.3409E+000.3436E+000.3459E+00

.3477E+000.3492E+000.3503E+000.3510E+000.3515E+000.3518E+000.3518E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1070E-02 CM

DAY 10 HOUR 16.00

WATER IN PROFILE 37.56 CM

WATER CONTENT AT THE NODES(CC/CC)

.4000E-010.1596E+000.1611E+000.1763E+000.1913E+000.2053E+000.2162E+000.2237E+000.3363E+000.3400E+000.3429E+000.3452E+00

.3471E+000.3486E+000.3497E+000.3505E+000.3510E+000.3512E+000.3512E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2096E-02 CM

DAY 10 HOUR 24.00

WATER IN PROFILE 37.56 CM

WATER CONTENT AT THE NODES(CC/CC)

.1257E+000,.1257E+000,.1565E+000,.1789E+000,.1954E+000,.2073E+000,.2163E+000,.2230E+000,.3358E+000,.3393E+000,.3421E+000,.3445E+00

.3465E+000,.3480E+000,.3491E+000,.3499E+000,.3504E+000,.3507E+000,.3507E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3081E-02 CM

STAGE 1 STAGE DAY 10 DAY NO. 10

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.18084	32.56598
2	90.00000	0.34508	73.30231

DAILY VALUES (CM)					CUMULATIVE VALUES (CM)				
PE	AE	TRANS	PRECIP	INFILT	PE	AE	TRANS	PRECIP	INFILT
0.700	0.284	0.275	0.000	0.000	7.000	4.465	3.387	0.000	0.000

WATER IN PROFILE 37.56 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.3081E-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.1252E+00	0.4772E+05	0.3275E-10	0.8887E-04
0.3155E+01	0.1252E+00	0.4771E+05	0.3275E-10	0.8888E-04
0.4845E+01	0.1318E+00	0.3316E+05	0.7904E-10	0.1416E-03
0.7155E+01	0.1497E+00	0.1337E+05	0.7130E-09	0.4534E-03
0.8845E+01	0.1609E+00	0.7979E+04	0.2489E-08	0.8784E-03
0.1115E+02	0.1738E+00	0.4622E+04	0.9333E-08	0.1768E-02
0.1285E+02	0.1820E+00	0.3331E+04	0.2063E-07	0.2689E-02
0.1515E+02	0.1915E+00	0.2317E+04	0.4970E-07	0.4281E-02
0.1685E+02	0.1975E+00	0.1856E+04	0.8501E-07	0.5687E-02
0.1915E+02	0.2046E+00	0.1447E+04	0.1553E-06	0.7822E-02
0.2148E+02	0.2091E+00	0.1239E+04	0.2261E-06	0.9542E-02
0.2552E+02	0.2144E+00	0.1037E+04	0.3479E-06	0.1198E-01
0.2763E+02	0.2177E+00	0.9286E+03	0.4548E-06	0.1381E-01
0.2937E+02	0.2216E+00	0.8187E+03	0.6169E-06	0.1623E-01
0.3063E+02	0.2469E+00	0.3795E+03	0.5641E-02	0.4344E-01
0.3237E+02	0.3120E+00	0.2647E+04	0.1403E-03	0.9546E-02
0.3406E+02	0.3366E+00	0.1115E+04	0.6982E-06	0.2637E-01
0.3694E+02	0.3386E+00	0.1042E+04	0.8144E-06	0.2857E-01
0.3927E+02	0.3399E+00	0.9957E+03	0.9024E-06	0.3013E-01
0.4273E+02	0.3416E+00	0.9416E+03	0.1024E-05	0.3217E-01
0.4527E+02	0.3427E+00	0.9073E+03	0.1114E-05	0.3361E-01
0.4873E+02	0.3441E+00	0.8668E+03	0.1235E-05	0.3546E-01
0.5211E+02	0.3450E+00	0.8411E+03	0.1322E-05	0.3674E-01
0.5789E+02	0.3461E+00	0.8108E+03	0.1437E-05	0.3836E-01
0.6211E+02	0.3469E+00	0.7917E+03	0.1516E-05	0.3945E-01
0.6789E+02	0.3477E+00	0.7696E+03	0.1617E-05	0.4079E-01
0.7211E+02	0.3483E+00	0.7558E+03	0.1684E-05	0.4166E-01
0.7789E+02	0.3489E+00	0.7399E+03	0.1767E-05	0.4272E-01
0.8211E+02	0.3493E+00	0.7301E+03	0.1821E-05	0.4339E-01
0.8789E+02	0.3498E+00	0.7192E+03	0.1884E-05	0.4417E-01
0.9211E+02	0.3501E+00	0.7127E+03	0.1924E-05	0.4464E-01

0.9789E+02	0.3504E+00	0.7057E+03	0.1967E-05	0.4516E-01
0.1021E+03	0.3505E+00	0.7020E+03	0.1990E-05	0.4544E-01
0.1079E+03	0.3507E+00	0.6986E+03	0.2012E-05	0.4570E-01
0.1121E+03	0.3507E+00	0.6974E+03	0.2020E-05	0.4579E-01
0.1179E+03	0.3507E+00	0.6974E+03	0.2020E-05	0.4579E-01

ROOT DENSITY (GM PER CC) AT GAUSS POINTS

DEPTH	DENSITY
0.85	4.79
3.15	3.99
4.85	3.48
7.15	2.89
8.85	2.53
11.15	2.10
12.85	1.84
15.15	1.53
16.85	1.33
19.15	1.11
21.48	0.92
25.52	0.67
27.63	0.56
29.37	0.49
30.63	0.44
32.37	0.39
34.06	0.34
36.94	0.27
39.27	0.22
42.73	0.17
45.27	0.14
48.73	0.10
52.11	0.08
57.89	0.05
62.11	0.04
67.89	0.02
72.11	0.02
77.89	0.01
82.11	0.01
87.89	0.00
92.11	0.00
97.89	0.00
102.11	0.00
107.89	0.00
112.11	0.00
117.89	0.00

DAY 11 HOUR 8.00

WATER IN PROFILE 38.52 CM

WATER CONTENT AT THE NODES(CC/CC)

.2880E+000.2448E+000.2015E+000.1829E+000.1987E+000.2083E+000.2165E+000.2226E+000.3355E+000.3388E+000.3416E+000.3439E+00

.3458E+000.3474E+000.3485E+000.3493E+000.3498E+000.3501E+000.3501E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.9450E-03 CM

DAY 11 HOUR 16.00

WATER IN PROFILE 38.92 CM

WATER CONTENT AT THE NODES(CC/CC)

.2883E+000.2565E+000.2431E+000.2261E+000.2106E+000.2095E+000.2165E+000.2224E+000.3353E+000.3384E+000.3411E+000.3434E+00

.3453E+000.3468E+000.3479E+000.3488E+000.3493E+000.3496E+000.3496E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1852E-02 CM

DAY 11 HOUR 24.00

WATER IN PROFILE 39.87 CM

WATER CONTENT AT THE NODES(CC/CC)

.3152E+000.2940E+000.2853E+000.2739E+000.2594E+000.2406E+000.2254E+000.2226E+000.3352E+000.3381E+000.3407E+000.3429E+00

.3448E+000.3462E+000.3474E+000.3482E+000.3487E+000.3490E+000.3490E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2723E-02 CM

STAGE 2 STAGE DAY 1 DAY NO. 11

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.26157	110.94191
2	90.00000	0.34345	71.74960

DAILY VALUES (CM)					CUMULATIVE VALUES (CM)				
PE	AE	TRANS	PRECIP	INFILT	PE	AE	TRANS	PRECIP	INFILT
0.700	0.000	0.000	3.000	2.300	7.700	4.465	3.387	3.000	2.300

WATER IN PROFILE 39.87 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2723E-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.3104E+00	0.7429E+02	0.2060E-03	0.3509E+00
0.3155E+01	0.2980E+00	0.1935E+02	0.1019E-03	0.2418E+00
0.4845E+01	0.2916E+00	0.1160E+03	0.7006E-04	0.1984E+00
0.7155E+01	0.2865E+00	0.1314E+03	0.5176E-04	0.1690E+00
0.8845E+01	0.2823E+00	0.1462E+03	0.3999E-04	0.1475E+00
0.1115E+02	0.2757E+00	0.1728E+03	0.2668E-04	0.1190E+00
0.1285E+02	0.2702E+00	0.1994E+03	0.1986E-04	0.9909E-01
0.1515E+02	0.2618E+00	0.2499E+03	0.1091E-04	0.7419E-01
0.1685E+02	0.2547E+00	0.3039E+03	0.6798E-05	0.5775E-01
0.1915E+02	0.2438E+00	0.4153E+03	0.3192E-05	0.3871E-01
0.2148E+02	0.2366E+00	0.5135E+03	0.1909E-05	0.2950E-01
0.2552E+02	0.2280E+00	0.6689E+03	0.1006E-05	0.2102E-01
0.2763E+02	0.2243E+00	0.7502E+03	0.7623E-06	0.1815E-01
0.2937E+02	0.2230E+00	0.7824E+03	0.6885E-06	0.1720E-01
0.3063E+02	0.2463E+00	0.3854E+03	0.5571E-02	0.4259E-01
0.3237E+02	0.3114E+00	0.2711E+04	0.1362E-03	0.9281E-02
0.3406E+02	0.3358E+00	0.1146E+04	0.6560E-06	0.2553E-01
0.3694E+02	0.3375E+00	0.1082E+04	0.7477E-06	0.2733E-01
0.3927E+02	0.3387E+00	0.1040E+04	0.8177E-06	0.2863E-01
0.4273E+02	0.3401E+00	0.9890E+03	0.9162E-06	0.3037E-01
0.4527E+02	0.3412E+00	0.9560E+03	0.9895E-06	0.3161E-01
0.4873E+02	0.3424E+00	0.9160E+03	0.1090E-05	0.3323E-01
0.5211E+02	0.3433E+00	0.8902E+03	0.1163E-05	0.3437E-01

0.5749E+02	0.3444E+00	0.8592E+03	0.1260E-05	0.3583E-01
0.6211E+02	0.3451E+00	0.8394E+03	0.1328E-05	0.3683E-01
0.6789E+02	0.3459E+00	0.8160E+03	0.1416E-05	0.3807E-01
0.7211E+02	0.3465E+00	0.8013E+03	0.1475E-05	0.3890E-01
0.7789E+02	0.3471E+00	0.7842E+03	0.1549E-05	0.3990E-01
0.8211E+02	0.3476E+00	0.7736E+03	0.1598E-05	0.4054E-01
0.8789E+02	0.3480E+00	0.7616E+03	0.1655E-05	0.4129E-01
0.9211E+02	0.3483E+00	0.7548E+03	0.1691E-05	0.4175E-01
0.9789E+02	0.3486E+00	0.7468E+03	0.1730E-05	0.4225E-01
0.1021E+03	0.3488E+00	0.7427E+03	0.1752E-05	0.4253E-01
0.1079E+03	0.3490E+00	0.7390E+03	0.1772E-05	0.4278E-01
0.1121E+03	0.3490E+00	0.7377E+03	0.1779E-05	0.4287E-01
0.1179E+03	0.3490E+00	0.7377E+03		

DAY 12 HOUR 8.00

WATER IN PROFILE 39.81 CM

WATER CONTENT AT THE NODES(CC/CC)

.2580E+000,.2622E+000,.2630E+000,.2633E+000,.2605E+000,.2557E+000,.2496E+000,.2438E+000,.3458E+000,.3429E+000,.3421E+000,.3429E+00

.3443E+000,.3457E+000,.3469E+000,.3477E+000,.3482E+000,.3485E+000,.3485E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.8367E-03 CM

DAY 12 HOUR 16.00

WATER IN PROFILE 39.20 CM

WATER CONTENT AT THE NODES(CC/CC)

.1874E+000,.2119E+000,.2282E+000,.2404E+000,.2459E+000,.2482E+000,.2486E+000,.2477E+000,.3490E+000,.3474E+000,.3459E+000,.3451E+00

.3451E+000,.3457E+000,.3465E+000,.3472E+000,.3477E+000,.3479E+000,.3479E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1641E-02 CM

DAY 12 HOUR 24.00

WATER IN PROFILE 39.18 CM

WATER CONTENT AT THE NODES(CC/CC)

.2206E+000,.2207E+000,.2263E+000,.2331E+000,.2382E+000,.2417E+000,.2437E+000,.2445E+000,.3475E+000,.3473E+000,.3468E+000,.3464E+00

.3461E+000,.3462E+000,.3465E+000,.3469E+000,.3473E+000,.3475E+000,.3475E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2417E-02 CM

STAGE 2 STAGE DAY 2 DAY NO. 17

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.23432	84.49334
2	90.00000	0.34512	73.34400

DAILY VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
0.700	0.696	0.626	0.000	0.000

CUMULATIVE VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
8.400	5.161	4.014	3.000	2.300

WATER IN PROFILE 39.18 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2417E-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.2200E+00	0.8618E+03	0.5449E-06	0.1520E-01
0.3155E+01	0.2201E+00	0.8594E+03	0.5485E-06	0.1525E-01
0.4845E+01	0.2214E+00	0.8235E+03	0.6082E-06	0.1611E-01
0.7155E+01	0.2249E+00	0.7358E+03	0.7990E-06	0.1861E-01
0.8845E+01	0.2277E+00	0.6744E+03	0.9864E-06	0.2080E-01
0.1115E+02	0.2317E+00	0.5953E+03	0.1334E-05	0.2441E-01
0.1285E+02	0.2343E+00	0.5501E+03	0.1616E-05	0.2701E-01
0.1515E+02	0.2374E+00	0.5019E+03	0.2017E-05	0.3037E-01
0.1685E+02	0.2392E+00	0.4748E+03	0.2307E-05	0.3260E-01
0.1915E+02	0.2412E+00	0.4471E+03	0.2668E-05	0.3521E-01
0.2148E+02	0.2424E+00	0.4322E+03	0.2897E-05	0.3678E-01
0.2552E+02	0.2435E+00	0.4183E+03	0.3136E-05	0.3835E-01
0.2763E+02	0.2441E+00	0.4114E+03	0.3264E-05	0.3917E-01
0.2937E+02	0.2445E+00	0.4063E+03	0.3364E-05	0.3981E-01
0.3063E+02	0.2664E+00	0.2205E+03	0.1051E-01	0.8708E-01
0.3237E+02	0.3259E+00	0.1613E+04	0.2154E-03	0.1709E-01
0.3406E+02	0.3476E+00	0.7738E+03	0.1597E-05	0.4053E-01
0.3694E+02	0.3474E+00	0.7782E+03	0.1576E-05	0.4025E-01
0.3927E+02	0.3472E+00	0.7825E+03	0.1557E-05	0.3999E-01
0.4273E+02	0.3469E+00	0.7899E+03	0.1524E-05	0.3955E-01
0.4527E+02	0.3467E+00	0.7954E+03	0.1500E-05	0.3924E-01
0.4873E+02	0.3464E+00	0.8028E+03	0.1469E-05	0.3881E-01
0.5211E+02	0.3463E+00	0.8070E+03	0.1452E-05	0.3857E-01
0.5789E+02	0.3461E+00	0.8111E+03	0.1435E-05	0.3834E-01
0.6211E+02	0.3461E+00	0.8122E+03	0.1431E-05	0.3828E-01
0.6789E+02	0.3461E+00	0.8109E+03	0.1436E-05	0.3835E-01
0.7211E+02	0.3462E+00	0.8084E+03	0.1446E-05	0.3849E-01
0.7789E+02	0.3464E+00	0.8031E+03	0.1468E-05	0.3880E-01
0.8211E+02	0.3466E+00	0.7987E+03	0.1486E-05	0.3905E-01
0.8789E+02	0.3468E+00	0.7920E+03	0.1515E-05	0.3943E-01
0.9211E+02	0.3470E+00	0.7876E+03	0.1534E-05	0.3969E-01
0.9789E+02	0.3472E+00	0.7821E+03	0.1558E-05	0.4002E-01
0.1021E+03	0.3473E+00	0.7790E+03	0.1572E-05	0.4021E-01
0.1079E+03	0.3475E+00	0.7760E+03	0.1586E-05	0.4039E-01
0.1121E+03	0.3475E+00	0.7749E+03	0.1591E-05	0.4046E-01
0.1179E+03	0.3475E+00	0.7749E+03	0.1591E-05	0.4046E-01

DAY 13 HOUR 8.00

WATER IN PROFILE 39.11 CM

WATER CONTENT AT THE NODES(CC/CC)

.2068E+000,.2235E+000,.2275E+000,.2328E+000,.2362E+000,.2388E+000,.2406E+000,.2418E+000,.3460E+000,.3464E+000,.3465E+000,.3465E+00

.3465E+000,.3465E+000,.3467E+000,.3469E+000,.3471E+000,.3472E+000,.3472E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.7528E-03 CM

DAY 13 HOUR 16.00

WATER IN PROFILE 39.51 CM

WATER CONTENT AT THE NODES(CC/CC)

.4319E-010,.1913E+000,.2122E+000,.2265E+000,.2331E+000,.2365E+000,.2387E+000,.2400E+000,.3451E+000,.3457E+000,.3461E+000,.3464E+00

.3465E+000.3466E+000.3467E+000.3469E+000.3469E+000.3470E+000.3470E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1493E-02 CM

DAY 13 HOUR 24.00

WATER IN PROFILE 38.49 CM

WATER CONTENT AT THE NODES(CC/CC)

.1614E+000.1614E+000.2037E+000.2195E+000.2279E+000.2330E+000.2362E+000.2381E+000.3441E+000.3449E+000.3456E+000.3461E+00

.3464E+000.3466E+000.3467E+000.3468E+000.3469E+000.3469E+000.3469E+000.3469E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2226E-02 CM

STAGE 2 STAGE DAY 3 DAY NO. 13

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.21309	63.87635
2	90.00000	0.34457	72.81699

DAILY VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
0.700	0.691	0.626	0.000	0.000

CUMULATIVE VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
9.100	5.851	4.640	3.000	2.300

WATER IN PROFILE 38.49 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2226E-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.1605E+00	0.8140E+04	0.2371E-08	0.8562E-03
0.3155E+01	0.1605E+00	0.8137E+04	0.2373E-08	0.8566E-03
0.4845E+01	0.1697E+00	0.5472E+04	0.6203E-08	0.1424E-02
0.7155E+01	0.1948E+00	0.2047E+04	0.6704E-07	0.5016E-02
0.8845E+01	0.2073E+00	0.1314E+04	0.1961E-06	0.8850E-02
0.1115E+02	0.2164E+00	0.9689E+03	0.4102E-06	0.1308E-01
0.1285E+02	0.2215E+00	0.8211E+03	0.6126E-06	0.1617E-01
0.1515E+02	0.2263E+00	0.7039E+03	0.8893E-06	0.1969E-01
0.1685E+02	0.2292E+00	0.6438E+03	0.1104E-05	0.2208E-01
0.1915E+02	0.2327E+00	0.5877E+03	0.1377E-05	0.2481E-01
0.2148E+02	0.2339E+00	0.5572E+03	0.1566E-05	0.2656E-01
0.2552E+02	0.2357E+00	0.5276E+03	0.1788E-05	0.2849E-01
0.2763E+02	0.2368E+00	0.5109E+03	0.1932E-05	0.2968E-01
0.2937E+02	0.2379E+00	0.4943E+03	0.2093E-05	0.3097E-01
0.3063E+02	0.2606E+00	0.2578E+03	0.8804E-02	0.7130E-01
0.3237E+02	0.3218E+00	0.1844E+04	0.1894E-03	0.1442E-01
0.3406E+02	0.3443E+00	0.8611E+03	0.1254E-05	0.3574E-01
0.3694E+02	0.3448E+00	0.8468E+03	0.1302E-05	0.3645E-01
0.3927E+02	0.3451E+00	0.8379E+03	0.1333E-05	0.3690E-01
0.4273E+02	0.3455E+00	0.8279E+03	0.1370E-05	0.3743E-01
0.4527E+02	0.3457E+00	0.8217E+03	0.1394E-05	0.3776E-01
0.4873E+02	0.3460E+00	0.8148E+03	0.1421E-05	0.3814E-01
0.5211E+02	0.3461E+00	0.8105E+03	0.1437E-05	0.3837E-01
0.5789E+02	0.3463E+00	0.8059E+03	0.1456E-05	0.3863E-01
0.6211E+02	0.3464E+00	0.8031E+03	0.1468E-05	0.3879E-01
0.6789E+02	0.3465E+00	0.8001E+03	0.1491E-05	0.3897E-01

0.7211E+02	0.3464E+00	0.7982E+03	0.1488E-05	0.3907E-01
0.7789E+02	0.3467E+00	0.7961E+03	0.1497E-05	0.3919E-01
0.8211E+02	0.3467E+00	0.7948E+03	0.1503E-05	0.3927E-01
0.8789E+02	0.3468E+00	0.7933E+03	0.1509E-05	0.3936E-01
0.9211E+02	0.3468E+00	0.7923E+03	0.1513E-05	0.3941E-01
0.9789E+02	0.3469E+00	0.7913E+03	0.1518E-05	0.3947E-01
0.1021E+03	0.3469E+00	0.7907E+03	0.1520E-05	0.3951E-01
0.1079E+03	0.3469E+00	0.7902E+03	0.1523E-05	0.3954E-01
0.1121E+03	0.3469E+00	0.7900E+03	0.1524E-05	0.3955E-01
0.1179E+03	0.3469E+00	0.7900E+03	0.1524E-05	0.3955E-01

DAY 14 HOUR 8.00

WATER IN PROFILE 38.42 CM

WATER CONTENT AT THE NODES(CC/CC)

.1252E+000,1786E+000,2065E+000,2177E+000,2250E+000,2303E+000,2338E+000,2361E+000,3429E+000,3441E+000,3450E+000,3456E+00

.3461E+000,3464E+000,3466E+000,3467E+000,3468E+000,3469E+000,3469E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.7293E-03 CM

DAY 14 HOUR 16.00

WATER IN PROFILE 37.86 CM

WATER CONTENT AT THE NODES(CC/CC)

.4000E-010,1399E+000,1707E+000,2093E+000,2227E+000,2286E+000,2320E+000,2344E+000,3420E+000,3433E+000,3444E+000,3452E+00

.3458E+000,3462E+000,3465E+000,3466E+000,3467E+000,3468E+000,3468E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.1455E-02 CM

DAY 14 HOUR 24.00

WATER IN PROFILE 37.83 CM

WATER CONTENT AT THE NODES(CC/CC)

.1101E+000,1101E+000,1827E+000,2062E+000,2183E+000,2255E+000,2299E+000,2329E+000,3411E+000,3426E+000,3438E+000,3447E+00

.3454E+000,3459E+000,3463E+000,3465E+000,3466E+000,3467E+000,3467E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.2176E-02 CM

STAGE 2 STAGE DAY 4 DAY NO. 14

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.19472	45.56208
2	90.00000	0.34363	71.92474

DAILY VALUES (CM) CUMULATIVE VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT	PE	AE	TRANS	PRECIP	INFILT
0.700	0.655	0.626	0.000	0.000	9.800	6.506	5.266	3.000	2.300

WATER IN PROFILE 37.83 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.2176E-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.1099E+00	0.1204E+06	0.3482E-11	0.2716E-04
0.3155E+01	0.1099E+00	0.1204E+06	0.3483E-11	0.2716E-04
0.4845E+01	0.1251E+00	0.4785E+05	0.3254E-10	0.8856E-04
0.7155E+01	0.1667E+00	0.6210E+04	0.4566E-08	0.1211E-02
0.8845E+01	0.1871E+00	0.2736E+04	0.3321E-07	0.3459E-02
0.1115E+02	0.2011E+00	0.1637E+04	0.1153E-06	0.6681E-02
0.1285E+02	0.2088E+00	0.1252E+04	0.2207E-06	0.9422E-02
0.1515E+02	0.2159E+00	0.9864E+03	0.3929E-06	0.1278E-01
0.1685E+02	0.2200E+00	0.8624E+03	0.5440E-06	0.1518E-01
0.1915E+02	0.2241E+00	0.7552E+03	0.7500E-06	0.1799E-01
0.2148E+02	0.2266E+00	0.6990E+03	0.9047E-06	0.1987E-01
0.2552E+02	0.2291E+00	0.6453E+03	0.1098E-05	0.2201E-01
0.2763E+02	0.2307E+00	0.6151E+03	0.1233E-05	0.2340E-01
0.2937E+02	0.2323E+00	0.5843E+03	0.1396E-05	0.2500E-01
0.3063E+02	0.2558E+00	0.2945E+03	0.7571E-02	0.6013E-01
0.3237E+02	0.3183E+00	0.2110E+04	0.1701E-03	0.1246E-01
0.3406E+02	0.3414E+00	0.9471E+03	0.1011E-05	0.3195E-01
0.3694E+02	0.3423E+00	0.9205E+03	0.1078E-05	0.3305E-01
0.3927E+02	0.3429E+00	0.9034E+03	0.1125E-05	0.3378E-01
0.4273E+02	0.3435E+00	0.8831E+03	0.1184E-05	0.3469E-01
0.4527E+02	0.3440E+00	0.8701E+03	0.1224E-05	0.3530E-01
0.4873E+02	0.3445E+00	0.8548E+03	0.1275E-05	0.3605E-01
0.5211E+02	0.3449E+00	0.8450E+03	0.1308E-05	0.3654E-01
0.5789E+02	0.3453E+00	0.8337E+03	0.1349E-05	0.3712E-01
0.6211E+02	0.3455E+00	0.8267E+03	0.1375E-05	0.3749E-01
0.6789E+02	0.3458E+00	0.8188E+03	0.1405E-05	0.3792E-01
0.7211E+02	0.3460E+00	0.8141E+03	0.1423E-05	0.3818E-01
0.7789E+02	0.3462E+00	0.8088E+03	0.1444E-05	0.3847E-01
0.8211E+02	0.3463E+00	0.8057E+03	0.1457E-05	0.3865E-01
0.8789E+02	0.3464E+00	0.8024E+03	0.1471E-05	0.3883E-01
0.9211E+02	0.3465E+00	0.8004E+03	0.1479E-05	0.3895E-01
0.9789E+02	0.3466E+00	0.7984E+03	0.1487E-05	0.3906E-01
0.1021E+03	0.3466E+00	0.7974E+03	0.1492E-05	0.3912E-01
0.1079E+03	0.3467E+00	0.7965E+03	0.1496E-05	0.3917E-01
0.1121E+03	0.3467E+00	0.7961E+03	0.1497E-05	0.3919E-01
0.1179E+03	0.3467E+00	0.7961E+03	0.1497E-05	0.3919E-01

DAY 15 HOUR 8.00

WATER IN PROFILE 37.75 CM

WATER CONTENT AT THE NODES(CC/CC)

.4695E-010.1375E+000.1833E+000.2049E+000.2168E+000.2235E+000.2280E+000.2312E+000.3401E+000.3418E+000.3431E+000.3442E+00

.3450E+000.3456E+000.3460E+000.3463E+000.3465E+000.3466E+000.3466E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.7149E-03 CM

DAY 15 HOUR 16.00

WATER IN PROFILE 37.22 CM

WATER CONTENT AT THE NODES(CC/CC)

.4505E-010.1471E+000.1562E+000.1383E+000.1864E+000.2189E+000.2264E+000.2298E+000.3393E+000.3411E+000.3425E+000.3437E+00

.3446E+000.3453E+000.3459E+000.3461E+000.3463E+000.3464E+000.3464E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.1422E-02 CM

DAY 15 HOUR 24.00

WATER IN PROFILE 37.22 CM

WATER CONTENT AT THE NODES(CC/CC)

.1190E+000,1190E+000,1457E+000,1529E+000,1975E+000,2135E+000,2221E+000,2272E+000,3380E+000,3402E+000,3419E+000,3432E+00
.3442E+000,3450E+000,3455E+000,3459E+000,3461E+000,3462E+000,3462E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.2121E-02 CM

STAGE 2 STAGE DAY 5 DAY NO. 15

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.1727	29.10636
2	90.00000	0.34251	70.45764

DAILY VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
0.700	0.618	0.616	0.000	0.000

CUMULATIVE VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
10.500	7.124	5.882	3.000	2.300

WATER IN PROFILE 37.22 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.2121E-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.1185E+00	0.7038E+05	0.1278E-10	0.5402E-04
0.3155E+01	0.1185E+00	0.7037E+05	0.1278E-10	0.5403E-04
0.4845E+01	0.1245E+00	0.4972E+05	0.2964E-10	0.8431E-04
0.7155E+01	0.1407E+00	0.2081E+05	0.2442E-09	0.2572E-03
0.8945E+01	0.1474E+00	0.1491E+05	0.5477E-09	0.3944E-03
0.1115E+02	0.1497E+00	0.1339E+05	0.7105E-09	0.4526E-03
0.1285E+02	0.1604E+00	0.8186E+04	0.2339E-08	0.8500E-03
0.1515E+02	0.1874E+00	0.2702E+04	0.3425E-07	0.3516E-02
0.1685E+02	0.2008E+00	0.1654E+04	0.1124E-06	0.6592E-02
0.1915E+02	0.2103E+00	0.1190E+04	0.2494E-06	0.1005E-01
0.2148E+02	0.2156E+00	0.9957E+03	0.3841E-06	0.1263E-01
0.2552E+02	0.2206E+00	0.8441E+03	0.5729E-06	0.1560E-01
0.2763E+02	0.2236E+00	0.7684E+03	0.7194E-06	0.1760E-01
0.2937E+02	0.2265E+00	0.6997E+03	0.9023E-06	0.1984E-01
0.3063E+02	0.2510E+00	0.3373E+03	0.6479E-02	0.5052E-01
0.3237E+02	0.3148E+00	0.2390E+04	0.1527E-03	0.1077E-01
0.3406E+02	0.3386E+00	0.1040E+04	0.5169E-06	0.2861E-01
0.3694E+02	0.3399E+00	0.9076E+03	0.8985E-06	0.3006E-01
0.3927E+02	0.3407E+00	0.9711E+03	0.9550E-06	0.3103E-01
0.4273E+02	0.3416E+00	0.9408E+03	0.1026E-05	0.3221E-01
0.4527E+02	0.3423E+00	0.9216E+03	0.1075E-05	0.3300E-01
0.4873E+02	0.3430E+00	0.8992E+03	0.1137E-05	0.3397E-01
0.5211E+02	0.3435E+00	0.8850E+03	0.1178E-05	0.3461E-01
0.5789E+02	0.3441E+00	0.8683E+03	0.1230E-05	0.3539E-01
0.6211E+02	0.3444E+00	0.8579E+03	0.1264E-05	0.3590E-01
0.6789E+02	0.3448E+00	0.8459E+03	0.1305E-05	0.3650E-01
0.7211E+02	0.3451E+00	0.8384E+03	0.1332E-05	0.3688E-01
0.7789E+02	0.3454E+00	0.8300E+03	0.1362E-05	0.3732E-01
0.8211E+02	0.3456E+00	0.8248E+03	0.1382E-05	0.3759E-01
0.8789E+02	0.3458E+00	0.8192E+03	0.1403E-05	0.3790E-01

0.9211E+02	0.3459E+00	0.8158E+03	0.1417E-05	0.3808E-01
0.9798E+02	0.3461E+00	0.8123E+03	0.1430E-05	0.3827E-01
0.1021E+03	0.3461E+00	0.8104E+03	0.1438E-05	0.3838E-01
0.1079E+03	0.3462E+00	0.8088E+03	0.1445E-05	0.3847E-01
0.1121E+03	0.3462E+00	0.8082E+03	0.1447E-05	0.3851E-01
0.1179E+03	0.3462E+00	0.8082E+03	0.1447E-05	0.3851E-01

DAY 16 HOUR 8.00

WATER IN PROFILE 37.13 CM

WATER CONTENT AT THE NODES(CC/CC)

.5000E-010.1510E+000.1498E+000.1529E+000.1463E+000.2129E+000.2201E+000.2252E+000.3368E+000.3392E+000.3411E+000.3426E+00

.3438E+000.3446E+000.3452E+000.3456E+000.3459E+000.3460E+000.3460E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.6879E-03 CM

DAY 16 HOUR 16.00

WATER IN PROFILE 36.59 CM

WATER CONTENT AT THE NODES(CC/CC)

.4000E-010.1571E+000.1480E+000.1547E+000.1303E+000.1814E+000.2106E+000.2222E+000.3356E+000.3384E+000.3404E+000.3420E+00

.3433E+000.3442E+000.3449E+000.3453E+000.3456E+000.3458E+000.3458E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1364E-02 CM

DAY 16 HOUR 24.00

WATER IN PROFILE 36.59 CM

WATER CONTENT AT THE NODES(CC/CC)

.1211E+000.1211E+000.1411E+000.1490E+000.1413E+000.1900E+000.2087E+000.2183E+000.3331E+000.3367E+000.3393E+000.3413E+00

.3427E+000.3438E+000.3445E+000.3450E+000.3453E+000.3455E+000.3455E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2028E-02 CM

STAGE 2 STAGE DAY 6 DAY NO. 16

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.16200	14.28273
2	90.00000	0.34091	69.33372

DAILY VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
0.700	0.622	0.616	0.000	0.000

CUMULATIVE VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
11.200	7.746	6.498	3.000	2.300

WATER IN PROFILE 36.59 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.2028E-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.1207E+00	0.6174E+05	0.1754E-10	0.6387E-04

0.3155E+01	0.1207E+00	0.6175E+05	0.1754E-10	0.6387E-04
0.4845E+01	0.1251E+00	0.4798E+05	0.3232E-10	0.8825E-04
0.7155E+01	0.1370E+00	0.2512E+05	0.1548E-09	0.2022E-03
0.8845E+01	0.1431E+00	0.1844E+05	0.3274E-09	0.3004E-03
0.1115E+02	0.1478E+00	0.1464E+05	0.5723E-09	0.4037E-03
0.1285E+02	0.1474E+00	0.1490E+05	0.5488E-09	0.3948E-03
0.1515E+02	0.1417E+00	0.1972E+05	0.2793E-09	0.2757E-03
0.1685E+02	0.1502E+00	0.1307E+05	0.7531E-09	0.4668E-03
0.1915E+02	0.1789E+00	0.3761E+04	0.1537E-07	0.2302E-02
0.2148E+02	0.1935E+00	0.2150E+04	0.5952E-07	0.4710E-02
0.2552E+02	0.2047E+00	0.1440E+04	0.1572E-06	0.7872E-02
0.2763E+02	0.2109E+00	0.1166E+04	0.2622E-06	0.1032E-01
0.2937E+02	0.2165E+00	0.9659E+03	0.4133E-06	0.1313E-01
0.3063E+02	0.2428E+00	0.4267E+03	0.4925E-02	0.3739E-01
0.3237E+02	0.3091E+00	0.2943E+04	0.1280E-03	0.8431E-02
0.3406E+02	0.3341E+00	0.1212E+04	0.5778E-06	0.2390E-01
0.3694E+02	0.3361E+00	0.1132E+04	0.6749E-06	0.2591E-01
0.3927E+02	0.3374E+00	0.1084E+04	0.7449E-06	0.2727E-01
0.4273E+02	0.3389E+00	0.1030E+04	0.8351E-06	0.2894E-01
0.4527E+02	0.3399E+00	0.9979E+03	0.8980E-06	0.3005E-01
0.4873E+02	0.3410E+00	0.9615E+03	0.9767E-06	0.3140E-01
0.5211E+02	0.3417E+00	0.9391E+03	0.1030E-05	0.3227E-01
0.5789E+02	0.3425E+00	0.9140E+03	0.1095E-05	0.3332E-01
0.6211E+02	0.3430E+00	0.8945E+03	0.1139E-05	0.3400E-01
0.6789E+02	0.3436E+00	0.8811E+03	0.1190E-05	0.3479E-01
0.7211E+02	0.3440E+00	0.8704E+03	0.1224E-05	0.3529E-01
0.7789E+02	0.3444E+00	0.8584E+03	0.1263E-05	0.3587E-01
0.8211E+02	0.3447E+00	0.8510E+03	0.1287E-05	0.3624E-01
0.8789E+02	0.3450E+00	0.8429E+03	0.1316E-05	0.3665E-01
0.9211E+02	0.3451E+00	0.8381E+03	0.1333E-05	0.3689E-01
0.9789E+02	0.3453E+00	0.8331E+03	0.1351E-05	0.3716E-01
0.1021E+03	0.3454E+00	0.8304E+03	0.1361E-05	0.3730E-01
0.1079E+03	0.3455E+00	0.8280E+03	0.1370E-05	0.3743E-01
0.1121E+03	0.3455E+00	0.8271E+03	0.1373E-05	0.3747E-01
0.1179E+03	0.3455E+00	0.8271E+03	0.1373E-05	0.3747E-01

DAY 17 HOUR 8.00

WATER IN PROFILE 36.51 CM

WATER CONTENT AT THE NODES(CC/CC)

.5000E-010,1531E+000,1454E+000,1493E+000,1438E+000,1849E+000,2066E+000,2169E+000,3321E+000,3356E+000,3383E+000,3405E+00

.3421E+000,3433E+000,3441E+000,3447E+000,3450E+000,3452E+000,3452E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.6506E-03 CM

DAY 17 HOUR 16.00

WATER IN PROFILE 35.97 CM

WATER CONTENT AT THE NODES(CC/CC)

.4060E-010,1578E+000,1478E+000,1481E+000,1463E+000,1525E+000,1554E+000,1904E+000,3242E+000,3334E+000,3374E+000,3398E+00

.3415E+000,3428E+000,3437E+000,3443E+000,3447E+000,3449E+000,3449E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1287E-02 CM

DAY 17 HOUR 24.00

WATER IN PROFILE 35.97 CM

WATER CONTENT AT THE NODES(CC/CC)

.1280E+000,1280E+000,1462E+000,1466E+000,1475E+000,1508E+000,1561E+000,1980E+000,3229E+000,3298E+000,3348E+000,3383E+00

.3406E+000,3422E+000,3432E+000,3439E+000,3443E+000,3446E+000,3446E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.1908E-02 CM

STAGE 7 STAGE DAY 7 DAY NO. 17

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.0000	0.1489	1.6168
2	90.0000	0.3381	66.7489

DAILY VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
0.700	0.621	0.616	0.000	0.000

CUMULATIVE VALUES (CM)

PE	AE	TRANS	PRECIP	INFILT
11.900	8.366	7.113	3.000	2.300

WATER IN PROFILE 35.97 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) =0.1908E-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.1270E+00	0.4319E+05	0.4168E-10	0.1010E-03
0.3155E+01	0.1270E+00	0.4319E+05	0.4168E-10	0.1010E-03
0.4845E+01	0.1308E+00	0.3487E+05	0.6999E-10	0.1328E-03
0.7155E+01	0.1414E+00	0.2004E+05	0.2575E-09	0.2700E-03
0.8845E+01	0.1456E+00	0.1630E+05	0.4411E-09	0.3517E-03
0.1115E+02	0.1464E+00	0.1569E+05	0.4834E-09	0.3693E-03
0.1285E+02	0.1468E+00	0.1536E+05	0.5099E-09	0.3797E-03
0.1515E+02	0.1472E+00	0.1503E+05	0.5367E-09	0.3902E-03
0.1685E+02	0.1482E+00	0.1438E+05	0.5976E-09	0.4130E-03
0.1915E+02	0.1502E+00	0.1302E+05	0.7598E-09	0.4689E-03
0.2148E+02	0.1538E+00	0.1103E+05	0.1137E-08	0.5803E-03
0.2552E+02	0.1614E+00	0.7815E+04	0.2617E-08	0.9021E-03
0.2763E+02	0.1715E+00	0.5078E+04	0.7432E-08	0.1567E-02
0.2937E+02	0.1914E+00	0.2324E+04	0.4933E-07	0.4265E-02
0.3063E+02	0.2249E+00	0.7374E+03	0.2577E-02	0.1855E-01
0.3237E+02	0.2965E+00	0.4742E+04	0.9557E-04	0.4811E-02
0.3406E+02	0.3242E+00	0.1711E+04	0.2650E-06	0.1595E-01
0.3694E+02	0.3284E+00	0.1478E+04	0.3690E-06	0.1894E-01
0.3927E+02	0.3310E+00	0.1351E+04	0.4525E-06	0.2105E-01
0.4273E+02	0.3339E+00	0.1222E+04	0.5640E-06	0.2369E-01
0.4527E+02	0.3357E+00	0.1149E+04	0.6531E-06	0.2547E-01
0.4873E+02	0.3377E+00	0.1073E+04	0.7625E-06	0.2761E-01
0.5211E+02	0.3390E+00	0.1029E+04	0.8373E-06	0.2898E-01
0.5789E+02	0.3403E+00	0.9843E+03	0.9263E-06	0.3054E-01
0.6211E+02	0.3411E+00	0.9581E+03	0.9845E-06	0.3153E-01
0.6789E+02	0.3420E+00	0.9307E+03	0.1051E-05	0.3262E-01
0.7211E+02	0.3425E+00	0.9144E+03	0.1094E-05	0.3330E-01
0.7789E+02	0.3431E+00	0.8969E+03	0.1143E-05	0.3407E-01
0.8211E+02	0.3434E+00	0.8864E+03	0.1174E-05	0.3454E-01
0.8789E+02	0.3438E+00	0.8750E+03	0.1209E-05	0.3508E-01
0.9211E+02	0.3441E+00	0.8682E+03	0.1230E-05	0.3540E-01
0.9789E+02	0.3443E+00	0.8612E+03	0.1253E-05	0.3573E-01
0.1021E+03	0.3444E+00	0.8574E+03	0.1266E-05	0.3592E-01

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        0.1079E+03          0.3446E+00          0.8541E+03          0.1277E-05          0.3609E-01
        0.1121E+03          0.3446E+00          0.8529E+03          0.1281E-05          0.3615E-01
        0.1179E+03          0.3446E+00          0.8529E+03          0.1281E-05          0.3615E-01

DAY         18      HOUR         8.00
WATER IN PROFILE      35.89  CM
WATER CONTENT AT THE NODES(CC/CC)
.4984E-010,1646E+000,1514E+000,1485E+000,1471E+000,1509E+000,1656E+000,1901E+000,3206E+000,3286E+000,3335E+000,3370E+00
.3396E+000,3414E+000,3427E+000,3435E+000,3440E+000,3442E+000,3442E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.6047E-03   CM
DAY         18      HOUR        16.00
WATER IN PROFILE      35.35  CM
WATER CONTENT AT THE NODES(CC/CC)
.4000E-010,1378E+000,1254E+000,1478E+000,1478E+000,1481E+000,1624E+000,1628E+000,3044E+000,3223E+000,3309E+000,3358E+00
.3387E+000,3407E+000,3421E+000,3430E+000,3435E+000,3438E+000,3438E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1192E-02   CM
DAY         18      HOUR        24.00
WATER IN PROFILE      35.35  CM
WATER CONTENT AT THE NODES(CC/CC)
.1078E+000,1078E+000,1204E+000,1457E+000,1479E+000,1496E+000,1576E+000,1802E+000,3115E+000,3213E+000,3287E+000,3339E+00
.3375E+000,3399E+000,3414E+000,3424E+000,3430E+000,3433E+000,3433E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1760E-02   CM

STAGE          2    STAGE DAY          8     DAY NO.         18
  LAYER    THICKNESS(CM)   AV MOIST(CC/CC)   WATER CONTENT(PERCENT AVAIL)
    1         30.00000          0.13931            -7.75184
    2         90.00000          0.33469            63.42547
              DAILY VALUES (CM)                    CUMULATIVE VALUES (CM)
   PE       AE      TRANS   PRECIP   INFILT     PE       AE      TRANS   PRECIP   INFILT
  0.700    0.621    0.616    0.000    0.000   12.600    8.988    7.729    3.000    2.300
WATER IN PROFILE      35.35  CM
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1760E-02   CM

        DEPTH(CM)       WATER CONTENT(CC/CC)  SUCTION HEAD(CM)  CONDUCTIVITY(CM/MIN)  DIFFUSIVITY(CM*CM/MIN)
        0.8453E+00          0.1074E+00          0.1426E+06          0.2313E-11          0.2187E-04
        0.3155E+01          0.1074E+00          0.1426E+06          0.2314E-11          0.2167E-04
        0.4845E+01          0.1101E+00          0.1192E+06          0.3568E-11          0.2751E-04
        0.7155E+01          0.1176E+00          0.7472E+05          0.1106E-10          0.5004E-04
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0.8845E+01	0.1257E+00	0.4646E+05	0.3494E-10	0.9196E-04
0.1115E+02	0.1404E+00	0.2114E+05	0.2352E-09	0.2522E-03
0.1285E+02	0.1462E+00	0.1581E+05	0.4750E-09	0.3657E-03
0.1515E+02	0.1475E+00	0.1488E+05	0.5504E-09	0.3955E-03
0.1685E+02	0.1483E+00	0.1431E+05	0.6048E-09	0.4156E-03
0.1915E+02	0.1492E+00	0.1368E+05	0.6746E-09	0.4403E-03
0.2149E+02	0.1513E+00	0.1240E+05	0.8554E-09	0.4993E-03
0.2552E+02	0.1560E+00	0.9970E+04	0.1451E-08	0.6603E-03
0.2763E+02	0.1622E+00	0.7564E+04	0.2932E-08	0.9406E-03
0.2937E+02	0.1743E+00	0.4522E+04	0.9842E-08	0.1818E-02
0.3063E+02	0.2067E+00	0.1345E+04	0.1262E-02	0.8589E-02
0.3237E+02	0.2829E+00	0.8079E+04	0.5378E-04	0.2572E-02
0.3406E+02	0.3130E+00	0.2550E+04	0.1074E-06	0.9976E-02
0.3694E+02	0.3191E+00	0.2051E+04	0.1759E-06	0.1289E-01
0.3927E+02	0.3229E+00	0.1791E+04	0.2390E-06	0.1511E-01
0.4273E+02	0.3273E+00	0.1535E+04	0.3386E-06	0.1811E-01
0.4527E+02	0.3300E+00	0.1397E+04	0.4190E-06	0.2023E-01
0.4873E+02	0.3330E+00	0.1259E+04	0.5304E-06	0.2286E-01
0.5211E+02	0.3349E+00	0.1182E+04	0.6121E-06	0.2463E-01
0.5789E+02	0.3369E+00	0.1103E+04	0.7158E-06	0.2671E-01
0.6211E+02	0.3381E+00	0.1058E+04	0.7866E-06	0.2806E-01
0.6789E+02	0.3395E+00	0.1011E+04	0.8708E-06	0.2958E-01
0.7211E+02	0.3403E+00	0.9844E+03	0.9260E-06	0.3054E-01
0.7789E+02	0.3412E+00	0.9560E+03	0.9895E-06	0.3161E-01
0.8211E+02	0.3417E+00	0.9392E+03	0.1030E-05	0.3227E-01
0.8789E+02	0.3423E+00	0.9214E+03	0.1075E-05	0.3301E-01
0.9211E+02	0.3426E+00	0.9111E+03	0.1103E-05	0.3345E-01
0.9789E+02	0.3430E+00	0.9005E+03	0.1133E-05	0.3391E-01
0.1021E+03	0.3431E+00	0.8949E+03	0.1149E-05	0.3416E-01
0.1079E+03	0.3433E+00	0.8899E+03	0.1164E-05	0.3438E-01
0.1121E+03	0.3434E+00	0.8881E+03	0.1169E-05	0.3447E-01
0.1179E+03	0.3434E+00	0.8881E+03	0.1169E-05	0.3447E-01

DAY 19 HOUR 8.00

WATER IN PROFILE 35.27 CM

WATER CONTENT AT THE NODES(CC/CC)

.4495E-010,1318E+000,1223E+000,1461E+000,1478E+000,1493E+000,1597E+000,1779E+000,3112E+000,3220E+000,3281E+000,3329E+00

.3364E+000,3389E+000,3407E+000,3418E+000,3425E+000,3428E+000,3428E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.5484E-03 CM

DAY 19 HOUR 16.00

WATER IN PROFILE 34.74 CM

WATER CONTENT AT THE NODES(CC/CC)

.4000E-010,1233E+000,1140E+000,1450E+000,1483E+000,1469E+000,1615E+000,1537E+000,2801E+000,3015E+000,3226E+000,3314E+00

.3356E+000,3381E+000,3399E+000,3412E+000,3419E+000,3423E+000,3423E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1076E-02 CM

DAY 19 HOUR 24.00

WATER IN PROFILE 34.74 CM

WATER CONTENT AT THE NODES(CC/CC)

.9647E-010,.9647E-010,.1085E+000,.1434E+000,.1479E+000,.1485E+000,.1590E+000,.1540E+000,.2941E+000,.3089E+000,.3206E+000,.3286E+00

.3339E+000,.3371E+000,.3392E+000,.3405E+000,.3413E+000,.3417E+000,.3417E+00

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1581E-02 CM

STAGE 2 STAGE DAY 9 DAY NO. 19

LAYER	THICKNESS(CM)	AV MOIST(CC/CC)	WATER CONTENT(PERCENT AVAIL)
1	30.00000	0.13412	-12.79335
2	90.00000	0.33005	59.01149

DAILY VALUES (CM)					CUMULATIVE VALUES (CM)				
PE	AE	TRANS	PRECIP	INFILT	PE	AE	TRANS	PRECIP	INFILT
0.700	0.616	0.616	0.000	0.000	13.300	9.604	8.344	3.000	2.300

WATER IN PROFILE 34.74 CM

FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1581E-02 CM

DEPTH(CM)	WATER CONTENT(CC/CC)	SUCTION HEAD(CM)	CONDUCTIVITY(CM/MIN)	DIFFUSIVITY(CM*CM/MIN)
0.8453E+00	0.9643E-01	0.3062E+06	0.3635E-12	0.8217E-05
0.3155E+01	0.9643E-01	0.3062E+06	0.3635E-12	0.8217E-05
0.4845E+01	0.9910E-01	0.2521E+06	0.5820E-12	0.1054E-04
0.7155E+01	0.1064E+00	0.1520E+06	0.1979E-11	0.2014E-04
0.8845E+01	0.1163E+00	0.6055E+05	0.9214E-11	0.4545E-04
0.1115E+02	0.1362E+00	0.2625E+05	0.1392E-09	0.1911E-03
0.1285E+02	0.1444E+00	0.1728E+05	0.3832E-09	0.3265E-03
0.1515E+02	0.1471E+00	0.1517E+05	0.5248E-09	0.3856E-03
0.1685E+02	0.1481E+00	0.1444E+05	0.5917E-09	0.4108E-03
0.1915E+02	0.1492E+00	0.1434E+05	0.6017E-09	0.4145E-03
0.2148E+02	0.1507E+00	0.1277E+05	0.7969E-09	0.4809E-03
0.2552E+02	0.1572E+00	0.9448E+04	0.1653E-08	0.7074E-03
0.2763E+02	0.1582E+00	0.9030E+04	0.1844E-08	0.7496E-03
0.2937E+02	0.1544E+00	0.1073E+05	0.1216E-08	0.6014E-03
0.3063E+02	0.1826E+00	0.3250E+04	0.4457E-03	0.2776E-02
0.3237E+02	0.2634E+00	0.1826E+05	0.2539E-04	0.9861E-03
0.3406E+02	0.2962E+00	0.4788E+04	0.2581E-07	0.4757E-02
0.3694E+02	0.3051E+00	0.3421E+04	0.5523E-07	0.7061E-02
0.3927E+02	0.3109E+00	0.2755E+04	0.9016E-07	0.9108E-02
0.4273E+02	0.3180E+00	0.2128E+04	0.1517E-06	0.1234E-01
0.4527E+02	0.3224E+00	0.1823E+04	0.2295E-06	0.1480E-01
0.4873E+02	0.3271E+00	0.1544E+04	0.3346E-06	0.1800E-01
0.5211E+02	0.3300E+00	0.1399E+04	0.4181E-06	0.2021E-01
0.5789E+02	0.3330E+00	0.1261E+04	0.5282E-06	0.2282E-01
0.6211E+02	0.3347E+00	0.1187E+04	0.6060E-06	0.2450E-01
0.6789E+02	0.3366E+00	0.1115E+04	0.6987E-06	0.2638E-01
0.7211E+02	0.3377E+00	0.1074E+04	0.7603E-06	0.2757E-01
0.7789E+02	0.3389E+00	0.1033E+04	0.8308E-06	0.2887E-01
0.8211E+02	0.3396E+00	0.1009E+04	0.8743E-06	0.2967E-01
0.8789E+02	0.3403E+00	0.9836E+03	0.9276E-06	0.3057E-01
0.9211E+02	0.3408E+00	0.9692E+03	0.9593E-06	0.3110E-01
0.9789E+02	0.3412E+00	0.9544E+03	0.9933E-06	0.3167E-01
0.1021E+03	0.3415E+00	0.9464E+03	0.1012E-05	0.3198E-01
0.1079E+03	0.3417E+00	0.9395E+03	0.1029E-05	0.3226E-01
0.1121E+03	0.3418E+00	0.9370E+03	0.1036E-05	0.3236E-01
0.1179E+03	0.3418E+00	0.9370E+03	0.1036E-05	0.3236E-01

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DAY         20      HOUR         8.00
WATER IN PROFILE      34.65  CM
WATER CONTENT AT THE NODES(CC/CC)
.4261E-010.1132E+000.1072E+000.1439E+000.1474E+000.1493E+000.155RE+000.1592E+000.2960E+000.3101E+000.3209E+000.3276E+00
.3326E+000.3360E+000.3383E+000.3398E+000.3407E+000.3411E+000.3411E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.4833E-03   CM
DAY         20      HOUR        16.00
WATER IN PROFILE      34.12  CM
WATER CONTENT AT THE NODES(CC/CC)
.4000E-010.1126E+000.1066E+000.1431E+000.1476E+000.1480E+000.1565E+000.1489E+000.2829E+000.2825E+000.3008E+000.320RE+00
.3306E+000.3351E+000.3374E+000.3390E+000.3400E+000.3404E+000.3404E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.9443E-03   CM
DAY         20      HOUR        24.00
WATER IN PROFILE      34.12  CM
WATER CONTENT AT THE NODES(CC/CC)
.9013E-010.9013E-010.1030E+000.1417E+000.1474E+000.1487E+000.1555E+000.1479E+000.2847E+000.2909E+000.3071E+000.3198E+00
.3282E+000.3333E+000.3364E+000.33R2E+000.3393E+000.3398E+000.3398E+00
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1383E-02   CM

STAGE          2    STAGE DAY         10     DAY NO.         20
  LAYER    THICKNESS(CM)   AV MOIST(CC/CC)   WATER CONTENT(PERCENT AVAIL)
    1         30.00000          0.13095          -15.86756
    2         90.00000          0.32457           53.80139

            DAILY VALUES (CM)                    CUMULATIVE VALUES (CM)

   PE        AE      TRANS   PRECIP   INFILT     PE        AE      TRANS   PRECIP   INFILT
 0.700     0.616     0.616    0.000    0.000   14.000    10.220    8.960    3.000    7.300

WATER IN PROFILE      34.12  CM
FLUX THROUGH BOTTOM(+VE IF IN AND -VE IF OUT) -0.1383E-02   CM

        DEPTH(CM)        WATER CONTENT(CC/CC)   SUCTION HEAD(CM)   CONDUCTIVITY(CM/MIN)   DIFFUSIVITY(CM*CM/MIN)
         0.8453E+00           0.9009E-01          0.4968E+06           0.1126E-12             0.4420E-05
         0.3155E+01           0.9009E-01          0.4968E+06           0.1126E-12             0.4420E-05
         0.4845E+01           0.9289E-01          0.3995E+06           0.1909E-12             0.5844E-05
         0.7155E+01           0.1005E+00          0.2274E+06           0.7471E-12             0.1203E-04
         0.8845E+01           0.1115E+00          0.1092E+06           0.4414E-11             0.3079E-04
         0.1115E+02           0.1336E+00          0.3001E+05           0.1006E-09             0.1609E-03
         0.1285E+02           0.1430E+00          0.1856E+05           0.3222E-09             0.2979E-03
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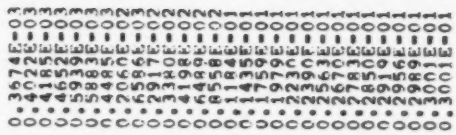

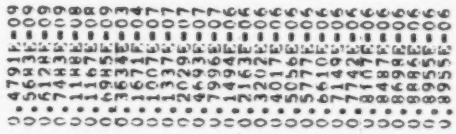

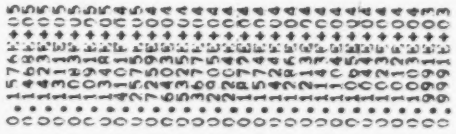

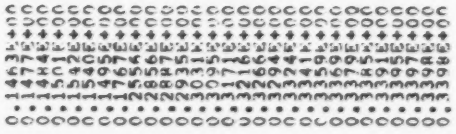

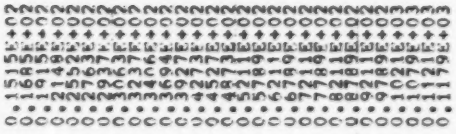

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